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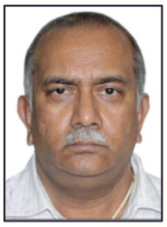

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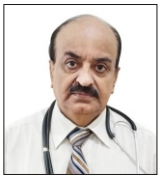
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[2]Handin RI — Bleeding and thrombosis. In: Wilson JD, Braunwald E, Isselbacher KJ, Petersdorf RG, Martin JB, Fauci AS, *et al* editors—Harrison's Principles of Internal Medicine. Vol 1. 12th ed. New York: Mc Graw Hill Inc, 1991: 348-53.

Reference from Electronic Media :

[3]National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/ theme_health/ HSQ 20.pdf (accessed Jan 24, 2005): 7-18.

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Editorial

Ushering in a New Era of Asthma Management — Global Innovations and India's Imperative

Asthma, a chronic respiratory ailment affecting over 260 million individuals globally, remains a significant public health challenge. India bears a disproportionate burden, accounting for approximately 13% of global cases and 42% of asthma-related deaths, underscoring the urgent need for innovative and accessible treatments.

Advancements in Biologic Therapies :

Recent clinical trials have spotlighted benralizumab, a monoclonal antibody, as a promising treatment for acute eosinophilic exacerbations of asthma. Published in The Lancet Respiratory Medicine, the study demonstrated that benralizumab significantly reduced treatment failures compared to standard corticosteroid therapy, marking a potential paradigm shift in managing severe asthma cases.

The trial, known as the Acute exacerbations treated with BenRAlizumab Study (ABRA), included patients with asthma, COPD, or both, with an eosinophilic endotype. Benralizumab's targeted mechanism of action, focusing on interleukin-5 receptor-α, offers a more precise approach to reducing eosinophilic inflammation, potentially leading to better patient outcomes and fewer side effects compared to systemic corticosteroids.

TOUCH RESPIRATORY

Triple-Combination Inhalers : A New Standard

AstraZeneca's Breztri Aerosphere, a triple-combination inhaler comprising budesonide, glycopyrronium, and formoterol, has achieved all primary endpoints in Phase III trials for uncontrolled asthma. The KALOS and LOGOS studies reported significant improvements in lung function, suggesting that Breztri could redefine standard asthma care.

Already approved for use in treating Chronic Obstructive Pulmonary Disease (COPD), Breztri's success in asthma trials indicates its potential to become a mainstay in asthma management. The inhaler's ability to deliver a combination of anti-inflammatory and bronchodilatory effects in a single device simplifies treatment regimens, potentially improving patient adherence and outcomes.

Enhancing Access Through Biosimilars :

The US FDA's approval of Omlyclo, the first interchangeable biosimilar to

omalizumab (Xolair), represents a significant step toward making advanced biologic therapies more accessible and affordable. This development holds promise for broader treatment options, especially in resource-constrained settings.

Omlyclo's approval was supported by positive phase III data demonstrating comparable efficacy and safety profiles with the reference product Xolair. The availability of biosimilars like Omlyclo can enhance accessibility and affordability of biologic therapies for patients with severe persistent allergic asthma.

Personalized Medicine and AI Integration :

Diag-Nose.io, an Australian biotech firm, is pioneering the use of artificial intelligence in asthma management through its RhinoMAP platform. By analyzing nasal liquid biopsy samples, RhinoMAP aims to tailor treatments based on individual biological profiles, potentially enhancing treatment efficacy and reducing healthcare costs.

The company's flagship product, the ABEL Microsampler, enables precise, non-invasive collection of nasal samples for omics-grade analysis. This innovation holds promise for reducing medical costs and improving health outcomes.

India's Path Forward :

Given the high prevalence and mortality associated with asthma in India, integrating these global advancements into national healthcare strategies is imperative. Emphasizing early diagnosis, expanding access to biologic therapies, and adopting AI-driven personalized medicine could significantly improve patient outcomes. Moreover, public health initiatives focusing on education and awareness are crucial to destigmatize the disease and encourage timely medical intervention.

Addressing asthma in India requires focused efforts on improving air quality, early diagnosis, and effective management strategies to reduce the disease burden. Urbanization and lifestyle changes have led to an increasing number of asthma cases, particularly among children and adolescents in urbanized areas. Occupational hazards, such as exposure to dust, chemicals, and pollutants, also contribute to higher asthma risks among farmers, factory workers, and construction workers.

In conclusion, the convergence of innovative therapies and technologies heralds a transformative era in asthma management. For India, embracing these advancements and tailoring them to the local context is essential to alleviate the burden of asthma and enhance the quality of life for millions.

Hony Editor, JIMA **Kakali Sen**

Original Article

Comparison of Delays and Its Impact among Women who Delivered Normally *versus* Those Women who Needed Admission to the Obstetrics ICU of a Tertiary Care Hospital in Gujarat, India : A Case Control Study

Vandana Majhi[1], Sangita V Patel[2], Maitri Shah[3], Latika Tarun Chugh[4], Reshma R[5], Saurav J Chaudhari[5], Jesal H Patel[6]

Abstract

Background : Outcome of pregnancy may not always favorable for both mother and baby. Early recognition and effective response related to these complications is a boon to contend the unpredictable results of pregnancy. So, the present study was conducted to assess the delays in birth preparedness and its impact on delivery outcomes.

Materials and Methods : A hospital-based case control study was conducted in a Tertiary Care Hospital. Participants were selected from postpartum delivery ward and obstetric ICU of the hospital. For cases 179 women were selected who required to get admitted in obstetric ICU during pregnancy and delivered whereas 179 women who had normal childbirth in hospital were selected for control group. Then both the group were interviewed and compared the delay present among them and its impact on delivery outcome.

Result : Around 131(73%) cases and 120(67%) controls were found to have delays present at any level. Delivery outcomes shows 15(11%) intrauterine fetal deaths among cases and only 2(1%) in control group.

Conclusion : Adverse maternal outcomes were seen in delays during pregnancy suggesting that timely and proper management are more helpful to mitigate them. More attention is required on the aspect of birth preparedness and complication readiness to reduce maternal mortality and morbidity.

Key words : Birth preparedness, Delays, Pregnancy, Maternal mortality.

Majority of maternal complications arises during pregnancy and many of them either prevented or effectively treated. Other complications may exist before pregnancy but are worsened during pregnancy, especially if not managed as part of the woman's care.

According to UN inter-agency estimates, the global maternal mortality ratio declined by 38% – from 342 deaths to 211 deaths per 1,00,000 live births from year 2000 to 2017. This translates into an average annual rate of reduction of 2.9%. While substantive, this is less than half the 6.4% annual rate needed to achieve the Sustainable Development global goal of 70 maternal deaths per 1,00,000 live births. There has been significant progress since 2000[1]. As per latest MMR Bulletin the maternal mortality ratio of India has declined to 113 in 2016-18 from 122 in 2015-17 and 130 in 2014-2016[2].

Editor's Comment :

- Timely recognition and management of delays during pregnancy can significantly reduce adverse maternal and fetal outcomes.
- Strengthening birth preparedness and complication readiness is essential to improving delivery outcomes and lowering maternal mortality and morbidity.

While much has been accomplished, more need to be done in future.

For achieving the SDG target of a global MMR of fewer than 70 maternal deaths per 1,00,000 live births by 2030 will require continued investment in maternal health research, programs and policy at the global level and very focused action in countries[3].

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Thaddeus and Maine (1994) have provided an explanatory model of maternal mortality that identifies delays in seeking, reaching and obtaining care as the important factors leading to maternal death. This explanatory model, known as the Three Delays Model, categories delays into three types which are: delays in reaching care, delays in seeking care and delays in receiving adequate care once at the point of service[4].

Maternal mortality and morbidity is the tip of an iceberg. Many women survive serious complications during pregnancy, delivery and the puerperium so investigation between the women who delivered normally and women who were admitted in Obstetric ICU of a Tertiary Care Hospital followed by delivery will identify the reasons of failures within the healthcare systems as well as other prospects of obstetrical care in the community.

Aims and Objectives

(1) To assess if there were any delays at various stages (such as decision-making, reaching healthcare facilities and receiving care) between women who experienced normal deliveries and those admitted to the Obstetric Intensive Care Unit (ICU) and delivered at a Tertiary Care Hospital.

(2) To assess how delays affect pregnancy outcomes upon reaching the hospital.

Materials and Methods

A case control study was conducted at Obstetrics and Gynecology department of a Tertiary Care Hospital. Based on pilot study, the proportion of first delay among controls was 59% and among cases was 42%. The ratio of cases and control was 1:1. By keeping 95% of confidence interval and 90% power a sample size of 358 patients with 179 in each group was calculated using MedcalC software. The study was approved by the Scientific and Ethical Committee of the institute. All patients who met with criteria of normal labour were considered as control excluding those who required LSCS[5]. And all postpartum women who had deviation from normal labour criteria and required to get admitted in Obstetric ICU were considered as cases[6]. The study was conducted from January, 2019 to December, 2020. Purposive sampling method was used for the allocation of subjects in cases and control group.

A predesigned and pretested questionnaire based on Thaddeus and Maine three delay model was administered to all the subjects of both the groups[4]. The questionnaire was validated for the study population by a pilot study. The operational definition of delay is when it takes more than an hour to make a decision, get to a hospital and get medical attention.

Participants were interviewed after taking written consent in a language which they understand before filling questionnaire forms. Participants in the case group were interviewed after the stabilization of the illness that resulted in their ICU admission. The interview was carried out in the language the study participants understood.

Data entry was done in Microsoft excel 2007 and analyzed by using MedcalC 14 software. Descriptive analysis was used to describe the distribution of all variables in cases and control group. Odds ratio was calculated for all delays with 95% confidence interval.

Results

In present study 129 (72%) cases were in the age group of 20-29 years with a mean of 25 (SD-5.1) and 148(82.6%) controls were in the same age group of 20-29 years with mean 25 (SD-4.1). There were 153(85%) cases and controls who were Hindus followed by 23(13%) cases and 24(14%) controls who were Muslim by religion. Only 1-2% controls and cases were Jain by religion respectively. There were 33(18%) cases and 7(4%) controls were from tribal area. Whereas 71(40%) cases and 58(32%) controls were from rural area and 75(45%) cases and 114(64%) controls were from urban area in the present study.

The level of education of study participants revealed that 56(31%) cases and 32(19%) controls were illiterate. 80(45%) cases and 73(40%) controls had completed primary level of education while 24(13%) cases and 42(23%) controls were educated upto secondary level. 16(9%) cases and 23(13%) control groups were educated upto higher secondary and only 3(2%) cases and 9(5%) controls were graduated. The study participants were divided into two subclasses depending upon the type of family. 100(56%) cases and 93(52%) control groups had joint family system and 79(44%) cases and 86(48%) control group had nuclear family system. The study subjects were assessed according to the Modified BG Prasad's Socio-economic Classification-2019 (Modified

according to current CPI January, 2019=330)[7]. Cases belonged to the upper middle class were 10(5.58%), lower middle class were 14(7.82%), upper lower class were 104(58.1%), and lower class were 51(28.4%) while 10(8.93%) controls belonged to upper middle class, 36(20.1%) to lower middle class, 97(54.1%) to upper lower class, and 30(16.7%) to lower class (Table 1).

Among 179 cases most commonly 21% of women experienced eclampsia, 20% severe abdominal pain, 16% antepartum hemorrhage, 20% severe anemia, 8% pre-eclampsia, 6% water breakout without labour and 3% fever whereas 6% had other reasons like hepatitis, loss of consciousness, ectopic pregnancy for cases admission. The control group experienced no complications and all deliveries were normal.

Between the cases and controls, it took an average of 1576 minutes (26 hours) and 390 minutes (7 hours) respectively to decide to seek medical attention. Failing to view the symptoms as serious were the main causes of the first delay among cases whereas lack of transportation and funds was primary cause among controls in making decision. In considering the second delay, the average amount of time taken to reach health facility was 64 and 43.3 minutes, respectively for the cases and controls. The average time taken for receiving care for cases and controls was 18 and 40 minutes, respectively.

In this study 1st delay was found among 110(61%) cases and 107(60%) controls. The odds ratio was 1.07(95% CI 0.70-1.63, P=0.7456), which shows statistically not significant. 2nd delay was found among 16(9%) cases and 6(3%) controls. And the odds ratio was 2.84(95%CI 1.08-7.4, P=0.003), which indicate that women who took more than 60min to reach health care facility had 2.8 times higher risk to get admitted in ICU with some maternal illness. Whereas 3rd delay was found among 5(3%) cases and 7(4%) controls and the odd ratio was 0.7(95%CI 0.21-2.26, P=0.55), which shows statistically not significant (Table 2).

Regarding unfavorable delivery outcomes in delayed participants, among 131 cases 49(37%) participants had delivered low birth weight baby, and 18(14%) cases delivered still birth, 15(11%) cases had IUFD, 36(27%) cases had premature birth 1 case had abortion. And among 120 controls 38(31%) participants had delivered low birth weight baby and 3(2%) cases delivered still birth, 2(1%) cases had IUFD, 2(1%) cases had premature birth.

Table 1 — *Socio-demographic characteristics of study participants*

Variables	Cases (n=179)	Controls (n=179)	Total (n=358)
Age	Mean 25 years SD (±5.1)	Mean 25 years SD (±4.1)	
<20 years	10(5%)	7(4%)	17(5%)
20-29 years	129(72%)	148(83%)	277(77%)
30-39 years	37(21%)	24(13%)	61(17%)
40-49 years	3(2%)	0	3(1%)
Religion :			
Hindu	153(85%)	153(85%)	306(86%)
Muslim	23(13%)	24(14%)	47(13%)
Jain	3(2%)	2(1%)	5(1%)
Residence :			
Tribal	33(18%)	7(4%)	40(11%)
Rural	71(40%)	58(32%)	129(36%)
Urban	75(42%)	114(64%)	189(53%)
Participant's education :			
Illiterate	56(31%)	32(19%)	88(25%)
Primary	80(45%)	73(40%)	153(43%)
Secondary	24(13%)	42(23%)	66(18%)
Higher secondary	16(9%)	23(13%)	39(11%)
Graduate	3(2%)	9(5%)	12(3%)
Participant's husband's education :			
Illiterate	39(21%)	20(11%)	59(16%)
Primary	66(37%)	53(30%)	119(33%)
Secondary	49(27%)	64(36%)	113(32%)
Higher secondary	20(11%)	27(15%)	47(13%)
Graduate	5(3%)	15(8%)	20(6%)
Type of family :			
Joint	100(56%)	93(52%)	193(54%)
Nuclear	79(44%)	86(48%)	165(46%)
Socio-economic class :			
Upper middle	10(6%)	16(9%)	26(7%)
Lower middle	14(8%)	36(20%)	50(14%)
Upper lower	104(58%)	97(54%)	211(56%)
Lower	51(28%)	30(17%)	50(14%)

Table2 — *Distribution of study participants with respect to different level of delays during pregnancy*

Delay	Cases (n=179)	Control (n=179)	Odd ratio	P-Value
1st Delay in decision to seek care				
Present (≥60min)	110(61%)	107(60%)	1.07	0.7456
Absent (≤60min)	69(39%)	72(40%)	CI 95%-0.7024-1.6394	
2nd Delay in reaching care				
Present (≥60min)	16(9%)	6(3%)	2.8303	0.0034
Absent (≤60min)	163(91%)	173(97%)	CI 95%-1.0811-7.4093	
3rd Delay in receiving adequate health care				
Present (≥60min)	5(3%)	7(4%)	0.7	0.55
Absent (≤60min)	174(97%)	172(96%)	CI 95%-0.2198-2.2678	

Discussion

The current study has revealed 1st delay was present in both the group participants. Most of the cases were already having illness like raised Blood Pressure and Anemia which transformed into more serious condition with time due to further delays like decision making, transport and seeking medical care. Early recognition and prompt action is the key to reduce such adverse pregnancy outcomes.

Several factors such as participants knowledge of danger signs of pregnancy, identification of mode of transport, savings for delivery expenses can contribute to birth preparedness which can prevent maternal morbidity and mortality. Hence more focus is needed in the field of birth preparedness as primary prevention to reduce the adverse maternal outcomes.

In our state, referral audit system is present that is done by nodal officers available in both Gynecology and Pediatric Department in Tertiary level health care so they get informed by the peripheral health facility about the cases who require immediate attention. Which provide them help to start the treatment immediately in the tertiary health care facility. That's the reason there was absence of 3rd delay in maximum participants.

A study conducted by Leonardo Antonio Chavane, *et al* (2016) in Mozambique, Sub-Saharan Africa region found that the second delay was more frequent when compared to third delay in more than 60% of women who died. The current study aligns with Chavane et al's findings regarding the prevalence of delays in maternal healthcare. Both studies emphasize the significance of the second delay, highlighting the detrimental impact on maternal outcomes[8].

In a study in Brazil conducted by Rodolfo C Pacagnella, *et al* (2010) found that the occurrence of any delay increased the severity of maternal outcome, particularly leading to maternal death. The current study echoes this concern, emphasizing the transformation of pre-existing illnesses into more serious conditions due to delays. Together, they advocate for comprehensive strategies to minimize delays and improve maternal health globally[9].

Similarly other authors Filippi V, *et al* identified an association between delays and severe pregnancy outcomes through maternal near miss aduits study in developing countries[10].

Another study conducted by Atsumi Hirose, *et al* in Afghanisthan have included some information on delays, the current study adds depth by specifically addressing the first delay and its impact on pre-existing illnesses. Both studies highlight the need for early recognition and prompt action to prevent adverse maternal outcomes. Integrating insights from both studies could inform targeted interventions that address delays comprehensively in diverse settings[11].

In an audit study conducted by Pius Okong, *et al* in Uganda, it was found that more than half of the cases of severe maternal morbidity was attributed to substandard care and a delay in Phase I as contributors to severe maternal morbidity. While the current study highlights the compounding impact of the second delay on pre-existing illnesses. Together, they emphasize the importance of addressing delays comprehensively, encompassing both healthcare quality improvements and timely interventions[12].

Another recent study carried out by Tiruneh G, *et al* (2020) in South Gondar found that severe maternal outcomes are significantly associated with delay in deciding to seek Emergency Obstetric Care. The present study complements this connection by highlighting the exacerbating influence of the second delay on adverse pregnancy outcomes[13].

A study conducted out by Shamsun Nahar, *et al* in Bangladesh found that first delay was significantly attributed to adverse maternal outcome and can be prevented by raising awareness through couple/ family-based education about maternal complications While the current study aligns with this perspective, it further emphasizes the compounding impact of the second delay on pre-existing illnesses[14].

Additionally, J Killewo, *et al* study in rural Bangladesh further reinforces the association between delays in decision-making, reaching and receiving care with pregnancy-related morbidities, aligning with the current study's emphasis on the first delay's impact on pre-existing illnesses[15].

Conclusion and Recommendation

Adequate birth preparedness and complication readiness can intervene adverse maternal and infant outcomes during pregnancy. To reduce the maternal and infant mortality and morbidity more emphasis should be given on raising awareness about danger signs of pregnancy for which a prompt action is

required to save life. This approach should be used in combination with initiatives to train community-based skilled birth attendants, upgrade public health facilities to provide emergency obstetric care, implement programs to increase access for the most vulnerable populations and enhance the standard of care at all levels. In summary, the current study contributes unique insights by focusing on the second delay and its association with pre-existing illnesses emphasizing the importance of comprehensive strategies to address delays and improve outcomes globally.

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Original Article

Association Between Admission Hyperglycemia and Outcome in Acute Stroke Patients

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Abstract

Background : Patients with acute ischemic stroke have been found to have a higher risk of hemorrhagic transformation of infarcts and post-thrombolytic hemorrhage if their blood glucose level is high.

Aims and Objectives : The aim of the study was to assess the relationship between admission blood sugar levels and the clinical outcome of patients admitted to the hospital within 24 hours of the onset of stroke.

Materials and Methods : Among 50 patients admitted to a Tertiary Care Centre in Salem, Tamil Nadu, within the first 24 hours after suffering a stroke, a cross-sectional analytical study was conducted between January, 2020 and December, 2021. The study included all patients over 35 years of age, of both genders, who presented to the hospital with a stroke and fulfilled the eligibility requirements. The National Institutes of Health Stroke Scale is used to test the extent of stroke in each individual patient.

Results : About a third of the patients were between the ages of 51 and 60. Nearly 64% of the patients were male. Most (64%) patients had co-morbidity hypertension, followed by a history of Diabetes Mellitus (42%). The severity of stroke among patients who presented with raised blood sugar was significantly higher when compared with patients who presented with euglycemia. Patients who presented with hyperglycemia had a 46.5% higher mortality rate than those who were euglycemic (4.5%). The mortality among patients who presented with hemorrhagic stroke was higher (33.3%) than that of among those with ischemic stroke (26.3%), though no statistical significance was seen.

Conclusion : In this study, it was discovered that stroke patients had high rates of hyperglycemia at the time of presentation, which was associated with increased stroke severity and mortality. As a result, hyperglycemia in people with an acute stroke should be taken into account as a sign of a poor prognosis.

Key words : Diabetes Mellitus, Ischemic Stroke, Hemorrhagic Stroke, Stroke.

The World Health Organization (WHO) defined stroke in 1970 as a quickly growing clinical symptom of the focal (or global) disruption of brain function that lasts more than 24 hours or results in death, with no obvious explanation other than a vascular origin[1].

Over the past two decades, the burden of stroke has continued to increase globally, especially in low and middle-income countries[2]. Stroke occurs at a rate that varies greatly from country to country, with the age-adjusted incidence rate ranging from 58 to 151 per 1,00,000 in studies conducted within the past two decades[3]. The incidence of stroke increases by approximately 25% in adults from 20 to 64 years of age, low and middle-income countries account for 18% of that burden[2].

Editor's Comment :

- Patients with acute ischemic stroke have a higher risk of hemorrhagic transformation of infarcts and post-thrombolytic hemorrhage if their blood glucose level is high.
- This study shows that hyperglycemia is highly prevalent among patients with stroke at the time of presentation, and that it is associated with worse stroke outcomes. Therefore, hyperglycemia should be considered as an indicator of a poor prognosis in patients with acute stroke.

Stroke outcomes depend on a large number of variables, such as the severity of the initial stroke, stroke care standards, and the unique characteristics of each patient. It is imperative that treating physicians and clinicians identify the predictors of stroke outcome and case fatality in order to provide patients at high risk of death with effective therapy and management. Some aspects of acute stroke care necessitate action

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at the administrative or public health level, whereas others are patient-specific and necessitate individualized clinical intervention. One such factor is high blood sugar, which has been associated with poor outcomes in stroke survivors[4].

It is a common sign of an impending stroke. Patients with preexisting Diabetes Mellitus or those who suffer a sudden neurological injury may experience this stress reaction[5]. Van Kooten, *et al* have mentioned in their literature that the prevalence of high blood sugar in stroke patients ranging from 5.6% to 45.2%[6]. This wide variation in prevalence may be due to the different definitions of hyperglycemia across different settings, the time blood glucose was measured, and the inclusion or exclusion of diabetic patients in the studies[7]. Hyperglycemia has been shown to negatively affect stroke outcomes in a variety of clinical and experimental settings. Patients with acute ischemic stroke have been shown to have a higher risk of hemorrhagic transformation of infarcts and post-thrombolytic hemorrhage if their blood glucose levels are high[8].

Compared to stroke patients with lower blood glucose levels, those with hyperglycemia after a stroke have a significantly higher risk of short-term death and a higher chance of poor functional recovery. Stroke severity was found to increase with admission blood glucose values above 108 mg/dl, according to a meta-analysis and systematic review of 32 studies. Stroke outcomes can be mitigated through primary and secondary level interventions aimed at preventing hyperglycemia and providing optimal treatment for lowering blood glucose levels following a stroke[9]. This study examined the association between admission blood sugar levels and the clinical outcome of patients hospitalized within 24 hours of the onset of stroke.

Materials and Methods

Study Settings :

Salem is a city located on the banks of the Thirumanimutharu River in the Indian state of Tamil Nadu. It is the sixth-largest urban agglomeration in the state by population and the fifth-largest city in Tamil Nadu by area, covering an area of 124 km^2. The Tertiary Care Centre is located in the rural area of Salem, and the hospital has 560 beds. The Department of General Medicine normally provides 24-hour service to more than one lakh outpatients per year, mainly to the people of Salem and partly to the neighboring districts of Erode and Namakkal. A hospital-based cross-sectional analytical study was carried out among patients hospitalized in a Tertiary Care Centre twenty-four hours after stroke.

Study Period and Study Population :

This study was conducted for two years, from January, 2020 to December, 2021. All patients above 35 years of age of both genders presented to the hospital with a stroke and fulfilled the eligibility requirements.

Ethical consideration : The approval for this study was obtained from the ethical clearance from the Institutional Ethics Committee on Human Subjects (Approval No. VMKVMC&H/IEC/20/16). Following clearance from the Institutional Ethics Committee, patients were recruited after getting written informed consent.

Selection of Study Participants :

Inclusion Criteria : Patients admitted to a Tertiary Care Centre's Department of General Medicine within twenty-four hours after the beginning of a stroke, patients who had no previous history of stroke, ie, patients experiencing their first stroke episode and blood sugar levels measured within twenty-four hours of the stroke

Exclusion Criteria : Patients who had received glucose intravenously prior to admission, patients who had passed away prior to establishing a history of diabetes and patients who had symptoms of stroke related to diseases.

Sample Size Determination and Sampling Method :

The long-term follow-up study of 811 patients with acute stroke confirmed by Computed Tomography noticed that the prevalence of hemorrhagic stroke was 14%[4]. Considering this prevalence, the minimum sample size of 47 was calculated using the formula $3.84*pq/d^2$, where prevalence (p) = 14, q (1-p) = 86, and precision (d) = 10, with a 95% Confidence Interval. All consecutive stroke patients, from January, 2020 to December, 2021, who attended the General Medicine Department at a Tertiary Care Centre and who fit the inclusion criteria were enrolled in the study.

Data collection procedure : A semi-structured questionnaire was used by the principal investigator using a one-on-one interview method to collect data. Each individual was given a thorough clinical examination, history was obtained and a clinical diagnosis was determined. All patients underwent an

Electrocardiogram, Chest X-ray and assessment of Blood Pressure, Glucose, Urea, Creatinine, Electrolytes, Hemoglobin, total and differential count, Urine Sugar, Albumin, Deposits and Urinalysis. Each patient's stroke severity is determined using the NIH Stroke Scale (NIHSS). The next step was for all patients to get a CT scan of the brain to confirm the diagnosis and identify the specific type of stroke. A venous blood sample is obtained within 24 hours of the onset of symptoms once a clinical diagnosis of acute stroke has been made and then forwarded to the laboratory for glucose determination. After 30 days of observation, the patients' outcomes were recorded as either death, poor, moderate or good improvement.

Study Tool :

(1) The National Institute of Health Stroke Scale (NIHSS)

The original description of this 15-item, 42-point clinical deficit measure was published in 1989. With an increased deficit, the score also increases. A maximum score of 42 points is accorded for a person who died and a score of more than 14 is used to define severe stroke[10]. The scale is simple, reliable, valid and compares agreeably with other scales. However, left hemisphere strokes have a tendency to be rated higher than right hemisphere strokes, often by roughly 4 points for the same extent of infarction[11].

(2) Glycemic status based on HbA1c level

(i) History of Diabetes : known diabetics

(ii) Non-diabetic blood glucose levels were considered as less than 6.1% mmol/l (euglycemic)

(iii) Blood glucose levels greater than 6.1mmol/l without a history of diabetes and hemoglobin A1c values greater than 6.4% were considered to indicate newly diagnosed diabetes.

(iv) Greater than 6.1 mmol/l blood glucose without history of diabetes, and hemoglobin A1c of less than 6.4% were considered as Stress hyperglycemic.

(3) Prognosis of the patient

(i) Patients who were unable to return to any type of employment, had permanent disability, required residential placement, were reliant on activities of daily living and had a stable deficit with no improvement were categorized as having a poor outcome.

(ii) Patients whose symptoms improved, who were independent in their day-to-day activities, whose motor function and aphasia improved and who did not have a persistent handicap were categorized as having a good outcome.

(iii) Patients who performed between these two groups were classified as having a moderate outcome.

Data processing and analysis : The obtained data were entered into Microsoft Excel (Redmond, WA: Microsoft Corporation) and analyzed with SPSS version 21 software (IBM Corp, Armonk, NY). For continuous variables such as age and the NIH severity scale, the mean and Standard Deviation were employed, as were frequency and percentages for gender, clinical outcome, etc. The chi-square test or Fisher's exact test was done to see the association of the glycemic status of patients with outcome.

Results

Nearly 32% of the patients were between the ages of 51 and 60, and nearly two-thirds (64%) were men. Nearly 64% of patients had hypertension as a co-morbidity, followed by a history of diabetes mellitus (42%). Only 10% of patients had coronary artery disease, while 16% had hypercholesterolemia. Almost one-third of the patients had a history of smoking and 16% had a history of alcohol consumption. Approximately 62% of the patients had stage 2 hypertension, followed by stage 1 hypertension (20%). Table 1 describes the distribution of the patients' characteristics.

The newly diagnosed hyperglycemia cases had the highest mortality rate (80%), followed by the stress hyperglycemia cases (50 percent). In addition, the severity of stroke in patients who presented with elevated blood sugar was significantly greater than in patients with euglycemia. Table 2 describes the relationship between the patient's blood sugar level at the time of the stroke and the severity of the stroke.

Patients with elevated blood sugar had a significantly higher mortality rate (46.4%) than those who presented with euglycemia (4.5%). In addition, the mortality rate among those newly diagnosed with diabetes was significantly higher than that of those with other glycemic statuses. Table 3 describes the relationship between a patient's blood sugar level when they were admitted and the outcome of their condition, broken down by glycemic status.

Patients who presented with a hemorrhagic stroke had a higher mortality rate (33.3%) than those who

Table 1 — *The distribution of the patients' characteristics (N=50)*

Variable	Frequency (n=50)	Percentage (%)
Age Group :		
50 years	11	22%
51-60 years	16	32%
61-70 years	9	18%
>70 years	14	28%
Gender :		
Male	32	64%
Female	18	36%
Co-morbidities :		
Diabetes Mellitus	21	42%
Hypertension	32	64%
Coronary artery disease	5	10%
Hyper-cholesterolaemia	8	16%
Others*	5	10%
Personal habits :		
Smoking	16	32%
Alcohol	8	16%
Classification of Blood Pressure :		
Normal	4	8%
Pre-hypertension	5	30%
Stage 1 Hypertension	10	20%
Stage 2 Hypertension	31	62%

*Atrial fibrillation, Rheumatic heart disease, Dilated cardiomyopathy, Mitral valve prolapse

presented with an ischemic stroke (26.3%), although this difference was not statistically significant. Moreover, in patients with ischemic stroke, stress hyperglycemia and newly diagnosed hyperglycemia were likely associated with a higher mortality rate. In contrast, only one of the patients who presented with a hemorrhagic stroke was euglycemic, and the two patients newly diagnosed with hyperglycemia had died. Table 4 describes the association between glycemic status and outcome based on the type of stroke.

Discussion

Stroke outcomes depend on a wide variety of variables, such as the severity of the initial stroke, current stroke care guidelines, and individual patient characteristics. It is of the utmost importance for the treating physician or clinician to identify the predictors of stroke outcome and case fatality so that specific and appropriate treatment and management strategies can be applied to patients at high risk of death.

One characteristic that predicts a worse prognosis after a stroke is a patient's increased blood glucose

Table 3 — *Association of blood sugar level at admission and outcome of patients according to different glycemic status*

Glycemic Status	Favorable outcome (n=36)	Death, (n=14)	P value
Association of blood sugar level at admission and outcome			
Euglycemia	21 (95.5%)	1 (4.5%)	0.001*
Raised Blood Sugar	15 (53.6%)	13 (46.4%)	
The outcome of patients according to different glycemic status			
Euglycemia	20 (95.2%)	1 (4.8%)	0.003*
Stress Hyperglycemia	2 (50%)	2 (50%)	
Newly diagnosed diabetes	1 (20%)	4 (80%)	
Known Diabetes	13 (65%)	7 (35%)	

*Statistically significant value (p value <0.05)

Table 4 — *Association of glycemic status and outcome according to stroke type*

Association of glycemic status and outcome according to stroke type	Glycemic Status	Favorable outcome	Death	P value
Ischemic Stroke	Euglycemic	20(100%)	0(0%)	0.001*
	Stress Hyperglycemia	1(33.3%)	2(66.7%)	
	Newly detected Hyperglycemia	1(33.3%)	2(66.7%)	
	Known Diabetes	6(50%)	6(50%)	
Hemorrhagic Stroke	Euglycemic	0(0%)	1 (100%)	0.04*
	Stress Hyperglycemia	1(100%)	0(0%)	
	Newly detected Hyperglycemia	0(0%)	2(100%)	
	Known Diabetes	7(87.5%)	1(12.5%)	

*Statistically significant value (p value <0.05)

Table 2 — *Association of blood sugar level at the stroke severity and prognosis of the patient*

Stroke Status		Euglycemia (n=21)	Stress Hyperglycemia (n=4)	Newly detected Hyperglycemia (n=5)	Known Diabetes, (n=20)	P value
Severity of Stroke	Mild and moderate severity (NIHSS ≤14)	18 (85.7%)	2 (50.0%)	0 (0%)	6 (30%)	0.001*
	Severe and very severe (NIHSS >14)	3 (14.3%)	2 (50.0%)	5 (100%)	14 (70%)	
Prognosis of the patient	Good	13 (61.9%)	0 (0%)	0 (0%)	1 (5%)	0.0001*
	Moderate	4 (19%)	2 (50%)	0 (0%)	6 (30%)	
	Poor	3 (14.3%)	0 (0%)	1 (20%)	6 (30%)	
	Death	1 (4.8%)	2 (50%)	4 (80%)	7 (35%)	

NIHSS - National Institutes of Health Stroke Scale. *Statistically significant value (p value <0.05)

level[10]. It is a common symptom in the early phase of acute stroke and may be due to the patient's pre-existing diabetes or a stress response to the acute neurological injury[5].

Fifty individuals with either ischemic or hemorrhagic stroke who were seen at the study location within the first 24 hours after symptoms appeared participated in the study. In this study, the majority of patients (32%) were between the ages of 51 and 60, with a mean age of 62.66±10.95 years. The average age of the participants in the study by Haobam J, *et al*[12] was 58±7.9 years and Umpierrez GE, *et al*[13] also observed similar findings where the mean age was 59±4 years. A study indicated that as developed countries experience an increase in their elderly population, the mean age of patients increases in comparison to developing countries like India, where the mean age is lower[14]. Almost two-thirds (64%) of the patients in this study were men, indicating a male preponderance. Several other studies concur with this report that male gender is a stroke risk factor[4,12,15]. This may be due to the high prevalence of undiagnosed or inadequately treated hypertension, smoking history and an abundance of other cardiovascular risk factors in men. The protective role that estrogen hormones perform in women before menopause may also have contributed to these results.

In our study, 42% of patients who presented with a stroke had diabetes, which is higher than studies conducted in western countries[16,17]. This may be attributable to a lack of awareness and a changing lifestyle in developing nations such as India, including the dietary practices of the study area.

Stroke severity was considerably higher in patients who came with hyperglycemia compared to those who presented with euglycemia (P=0.05). Patients with hyperglycemia had a median NIHSS score of 14 (IQR 10-19), while those with normoglycemia had a median NIHSS score of 11 (IQR 8-15), as shown in the study by Zewde, *et al*. However, a significant association was not observed[18]. In line with the findings of our study, Stead LG, *et al* found a significant correlation between the severity of strokes and patients' blood sugar levels[19]. Stroke severity is increased by hyperglycemia due to its multiple pathophysiological mechanisms, including increased brain damage, increased infarct size due to stimulation of vasoconstrictive factors, decreased penumbral tissue salvage due to high lactate levels and increased neurotoxicity as a direct result of inflammation and oxidative stress[7,20,21].

Patients presenting with hyperglycemia had a much higher mortality rate than those with euglycemia (p=0.05). Researchers Li J, *et al* found that non-diabetic persons' relative stress hyperglycemia is a significant risk factor for mortality within a year after an ischemic stroke[22]. Two studies have shown that patients with acute stress hyperglycemia have a greater risk of passing away while hospitalized[9,23]. Two other trials found that people whose hyperglycemia was caused by stress had a poorer functional result after a stroke[24,25]. However, Tziomalos, *et al* found no relationship between stress hyperglycemia and the risk of hospital mortality and poor functional result following stroke[26].

Patients with hyperglycemia had a higher mortality rate after an ischemic stroke, according to research by Williams, *et al*[27]. Another study found that the probability of survival after a stroke decreases as the admission blood glucose level rises[28]. The entry blood glucose level is associated with a greater death rate, as observed by Watila, *et al*[29]. These discrepancies could be because studies use various criteria to define stress hyperglycemia.

Limitation :

This study had some limitations, including the fact that just one blood sugar reading was taken upon admission. Estimates of blood sugar levels taken at later times may have helped clinicians get a clearer picture of how blood sugar levels play a role in acute stroke patients, as well as how treatment outcomes change for these patients over time. Second, since lesion size was not measured, the relationship between lesion size and stroke outcome could not be evaluated in this study.

Conclusion

This study shows that Hyperglycemia is highly prevalent among patients with stroke at the time of presentation and that it is associated with worse stroke outcomes. Therefore, hyperglycemia should be considered an indicator of a poor prognosis in patients with acute stroke. If hyperglycemia is suspected in a patient with a stroke, quick action should be considered to bring blood glucose levels down to near normal in order to lessen the negative effects of the condition.

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Original Article

Morphometric Study of Dorsal and Lumbar Pedicles in the Indian Population — A Retrosepctive Study of 150 Cases

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Abstract

Background : The use of various sizes, types of pedicle screws in thoracic and lumbar spine is guided by the morphometry of the pedicles.

Aims and Objectives : To study the dimensions and orientation of pedicles in the thoracic and lumbar spine in Konkan region in India.

Materials and Methods : Pedicle dimensions of thoracic and lumbar spine of 150 people visiting a tertiary care hospital in Goa were studied.

Results : The transverse diameter of pedicles from D5 to L5 varied from 4.51 to 10.1 mm, sagittal diameter ranged from 5.4 to 11.69 mm. Transverse angle ranged from 3.27 to 21.09, sagittal angle varied between 2.19 to 16.51.

Conclusion : This study provides database of morphometric characteristics of thoracic and lumbar pedicles from D5 to L5 in population along Konkan coast of India and can provide information for future comparative studies.

Key words : Spine, Pedicle Size.

Transpedicular screw implantation techniques have been popular for years. Pedicular screw fixation gives stable and rigid construct in case of spinal injuries, therefore allowing early ambulation, preventing complications of immobility. Accurate insertion of pedicle screws is challenging and it has a steep learning curve and requires training to prevent complications. The challenges posed are the variable height, width, orientation of pedicles and nerve roots which are in proximity to the path of insertion.

Misdirected pedicular screw may injure pedicle cortex, nerve root, zygapophyseal joints and other vital structures including pleura, oesophagus, segmental and intercostal vessels[1,2]. Since the margin of error for inserting the pedicle screws is very low especially in thoracic pedicles the practice of measuring the size of transverse diameter of pedicles at the isthmus is imperative in preventing complications. Data obtained by linear and angular parameters of pedicle can help surgeons for safer screw placement in circumventing damage to nerve root, meninges and nearby vascular structures during surgeries. Pedicle sizes of different population around the world have been studied[3-5]. There are studies involving various parts of India[6-9].

Editor's Comment :

- This study provides morphometric data on thoracic and lumbar pedicles aiding surgeon safer pedicle screw placement.

Use of intraoperative fluoroscopy is the most commonly used method for correct placement of screws. Intraoperative CT navigation and robot assisted[10] methods are used but not available in all centres.

Materials and Methods

The study was carried out in Department of Orthopaedics, Goa Medical College. Scans were done using PHILIPS MX16 Slice CT scanner. Computed Tomographic scans of 150 random patients are taken into account with the help of Radiology Department software. Patient with obvious spine deformity and fractures are excluded from this study. A total of 3900 pedicles were studied for parameters like Transverse Diameter (TDP), Transverse Angle (TPA), Sagittal Diameter (SDP) and sagittal angle (SAP). The data was analysed and Paired t-test was used for comparison of parameters between sides (right *versus* left) and between sex (male *versus* female). One way ANOVA test was used to compare the data among various age groups. P

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value of <0.05 was considered statistically significant.

Transverse Diameter (TDP):

Thickness of pedicles measured by marking the deepest point in the medial and lateral aspect of each pedicle (both right and left) at right angles to the long axis of pedicle.

Transverse Angle (TPA) :

Angle between pedicle axis and a line parallel to the vertebral midline measured in transverse plane (Fig 1).

Sagittal Diameter (SDP) :

Vertical height of each pedicle from D5 to L5 measured at points just opposite to each other on upper and lower margins of pedicles at the point of maximum diameter in the vertical plane on its lateral aspect.

Sagittal Angle (SAP) :

Angle between pedicle axis and superior part of vertebral body in the sagittal plane (Figs 2.1 & 2.2).

Observation and Results

The age range of the participants is from 19-65 years with mean age of 48.01 years. There is no statistically significant difference in morphology in various age groups (p>0.05 in one-way ANOVA test), between pedicles of either side in all the vertebrae studied and also no statistically significant difference between male and female participants in our study (p>0.05 in independent t test). The ratio for male to female participants is 51:49 (Tables 1-3).

Transverse diameter of pedicles increased from higher to lower levels constantly. D5 vertebra had the least mean transverse diameter of 4.5mm and L5 with maximum diameter of 10.1mm. But the sagittal diameter of the pedicles did not show a similar trend with the maximum size measured at L2 vertebra with a mean of 14.1mm.

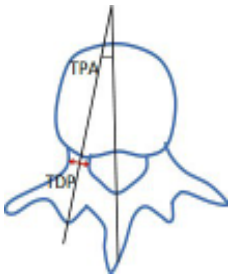
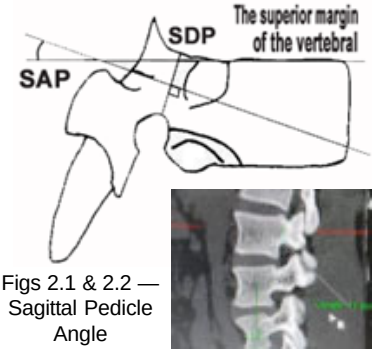


Fig 1 — Transverse Pedicle Angle



Figs 2.1 & 2.2 — Sagittal Pedicle Angle

Table 1 — *Data of Transverse Pedicle Diameters*

Transverse Diameter	side	N	Mean±SD	Median (IQR)
D5	Right	150	4.51±0.24	4.5(4.3,4.6)
	Left	150	4.51±0.24	4.5(4.3,4.6)
D6	Right	150	5.1±0.28	5.1(4.9,5.3)
	Left	150	5.11±0.28	5.1(4.9,5.3)
D7	Right	150	5.38±0.26	5.4(5.2,5.5)
	Left	150	5.38±0.26	5.4(5.2,5.5)
D8	Right	150	5.8±0.25	5.8(5.7,5.9)
	Left	150	5.8±0.25	5.8(5.7,5.9)
D9	Right	150	6.2±0.31	6.23(6,6.35)
	Left	150	6.2±0.31	6.23(6,6.35)
D10	Right	150	6.42±0.33	6.5(6.2,6.6)
	Left	150	6.42±0.33	6.5(6.2,6.6)
D11	Right	150	6.67±0.34	6.7(6.5,6.8)
	Left	150	6.67±0.34	6.7(6.5,6.8)
D12	Right	150	6.97±0.35	7(6.8,7.15)
	Left	150	6.97±0.35	7(6.8,7.15)
L1	Right	150	7.3±0.37	7.26(7.1,7.5)
	Left	150	7.3±0.37	7.26(7.12,7.5)
L2	Right	150	7.36±0.35	7.31(7.15,7.5)
	Left	150	7.36±0.35	7.32(7.15,7.52)
L3	Right	150	8.28±0.37	8.34(8.1,8.5)
	Left	150	8.29±0.37	8.34(8.1,8.5)
L4	Right	150	9.26±0.38	9.3(9.05,9.5)
	Left	150	9.26±0.38	9.3(9.05,9.5)
L5	Right	150	10.1±0.36	10.15(9.8,10.4)
	Left	150	10.11±0.36	10.15(9.8,10.4)

Table 2 — *Data of Sagittal Pedicle Diameters*

Sagittal Diameter	Side	N	Mean±SD	Median (IQR)
D5	Right	150	5.4±0.28	5.4(5.2,5.6)
	Left	150	5.4±0.28	5.4(5.2,5.6)
D6	Right	150	6.22±0.32	6.3(6,6.4)
	Left	150	6.22±0.32	6.3(6,6.4)
D7	Right	150	6.98±0.37	7(6.8,7.15)
	Left	150	6.98±0.37	7(6.8,7.15)
D8	Right	150	8.29±0.38	8.34(8.1,8.5)
	Left	150	8.29±0.38	8.34(8.1,8.5)
D9	Right	150	9.26±0.39	9.3(9.05,9.5)
	Left	150	9.26±0.39	9.3(9.05,9.5)
10	Right	150	10.11±0.37	10.18(9.8,10.4)
	Left	150	10.11±0.37	10.18(9.8,10.4)
D11	Right	150	11.04±0.4	11(10.8,11.3)
	Left	150	11.04±0.4	11(10.8,11.3)
D12	Right	150	11.92±0.44	11.9(11.5,12.2)
	Left	150	11.92±0.44	11.9(11.5,12.2)
L1	Right	150	13.2±0.36	13.2(13,13.5)
	Left	150	13.2±0.36	13.2(13,13.5)
L2	Right	150	14.14±0.55	14.2(13.9,14.5)
	Left	150	14.14±0.55	14.2(13.9,14.5)
L3	Right	150	13.26±0.4	13.2(13,13.5)
	Left	150	13.25±0.41	13.2(13,13.5)
L4	Right	150	11.92±0.45	11.9(11.5,12.2)
	Left	150	11.93±0.46	11.9(11.5,12.2)
L5	Right	150	11.69±0.48	11.56(11.4,12)
	Left	150	11.69±0.48	11.56(11.4,12)

The average measured transverse diameter and sagittal diameter of pedicles in our study excludes

Table 3 — *Demographic distribution of study population*

Sex	Frequency	Percent	Age	Frequency	Percent
F	74	49.3	<20	1	0.7
M	76	50.7	21-30	7	4.7
Total	150	100	31-40	27	18
			41-50	42	28
			51-60	63	42
			>60	10	6.7
			Total	150	100

the use of 5.5 mm pedicle screws in vertebrae D5-D7, 6.5mm pedicle screws in D8-D11.

There is no linear trend in both sagittal and transverse angle. The average medial angulation of the pedicles from our study is 5° in T5 to T10, 3° in T11-T12, 10-15° in L1 to L5. Sagittal angle is maximum at D10 (16.5°) and is minimum at L5 (2.19°).

Discussion

Pedicle screw insertion is easier and less dangerous in lumbar vertebrae than in dorsal because of the larger pedicle sizes. Techniques like Cortical Bone Trajectory (CBT) screw placement can be used to increase the stability of fixation and reduce the failures in osteoporotic patients[11]. Percutaneously inserted pedicle screws are reported to produce less complications in experienced hands[12]. Intraoperative use of CT scan/ O-arm will reduce the mal insertion of pedicle screws but is associated with increased radiation.

The limitations of the study are :

(1) Metrics like height, weight were not taken into consideration which would have helped in understanding better the pedicle morphology variations.

(2) Chord length of the vertebrae were not measured.

(3) A relatively small sample size

(4) Even though the study is conducted in Goa, the patient characteristics such as race is not collected, so the findings cannot be attributed to the coastal Konkan population of India.

Conclusion

Preoperative measurement of pedicle size at the isthmus level will reduce the risk of pedicle cortical breach. The axes of thoracic pedicles are directed more inferiorly than lumbar pedicles. The axes of lumbar pedicles are directed more medially than thoracic. The smallest pedicle is of D5 vertebra.

Even though the sagittal angle of L4 and L5 were found to be the least, the inferior angulation of the whole vertebra at the transition of lumbar lordosis to sacral kyphosis necessitates downward angulation of the pedicle screw during insertion.

The difference in the average transverse angle between dorsal and lumbar vertebrae means it will be difficult to use monoaxial screws during the instrumentation of dorso-lumbar junctional pathologies as this will cause difficulties in fixing the connecting rods to the pedicle screws. So, in these cases polyaxial pedicle screws should be used.

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Original Article

Feto-maternal Outcome in Fetal Macrosomia : A Case-Control Study

Medha Barua[1], Shyamal Dasgupta[2], Bishan Basu[3], Jhuma Biswas[4], Namrata Bhattacharya[5], Jaydeb Mahata[6], Rajkumar Maity[7]

Abstract

Background : Macrosomia may adversely affect feto-maternal outcomes and needs its risk factors to be evaluated during pre-conceptional and antenatal work up.

Materials and Methods : An analytical case control study was conducted for one and half years in a Tertiary Referral Centre of India with mothers (n=47) giving birth to macrosomic babies weighing 4000 gm or above and they were compared with controls (n=47) with babies weighing between 2500-3999 gm in relation to the risk factors and pregnancy outcomes. Aim of the study was to determine the risk factors increasing the chance of macrosomia to happen and to compare the incidence of adverse feto-maternal outcomes in macrosomia with babies born with normal birth weight.

Results : Maternal pre-pregnancy BMI and weight gain during pregnancy appeared to be strong risk factors ($p<0.001$) independently for macrosomia. Incidence of diabetes in pregnancy and morbidity related to Caesarean Sections (CS) were also high among cases ($p=0.007$ in both). Regarding neonatal complications higher incidence of neonatal hypoglycemia was reportedly found ($p=0.010$).

Conclusion : Due to significantly adverse feto-maternal outcomes due to macrosomia, Obstetricians should keep vigilant regarding the risk factors prior to delivery to promote healthy pregnancy outcomes.

Key words : Macrosomia, Caesarean Section, Obesity.

Fetal macrosomia is defined as an infant weight above 4000 gm or 4500 gm irrespective of gestational age, sex and ethnicity[1,2]. This weight threshold varies among countries due to insufficient and different academic and medical reporting. Macrosomia is associated with both short and long term feto-maternal adverse outcomes. Immediate complications include birth trauma, perinatal asphyxia, hypoglycaemia for the baby on the other hand mothers are at risk of increased operative morbidity, perineal trauma, prolonged labour, haemorrhage[3,4]. In later life macrosomic babies commonly develop child hood obesity, type1 and type 2 diabetes where mothers of macrosomic fetus likely to suffer from type 2 diabetes during post pregnancy period[5-7]. Risk factors for developing macrosomia include high parity, pregnancy with postmaturity, male gender of the fetus, pre-gestational and gestational diabetes, excessive gestational weight gain as per data mostly obtained from Western/Caucasian population and that might vary in Asian population. Even the risk of adverse outcomes may also differ in different ethnic background specially with low average birth weight, if the usual cut-off used to define macrosomia is applied[2]. In this study we aimed to estimate the prevalence of adverse outcomes of macrosomia affecting feto-maternal well-being and to determine the risk factors for developing those adverse outcomes in the study group with the pregnancy with normal baby weight.

Editor's Comment :

- Fetal Macrosomia has been shown to be associated with multiple intranatal, postnatal and neonatal complications. Hence, adequate and routine antenatal care is recommended for every antenatal mother for prevention, early detection and timely intervention in cases of fetal macrosomia so as to avoid complications and improve feto-maternal outcomes.

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Materials and Methods

This was a case control study done in the Department of Obstetrics and Gynecology of R G Kar Medical College and Hospital, India from December, 2022 to May, 2024 over a period of 18 months after being approved by Institutional Ethics Committee . Sample size was calculated to be 30-40 as 5 cases of macrosomic babies were found over a period of 2months in the proposed place of research in a pilot study. Total 94 participants including both cases and controls were included either from antenatal Clinic or in Patient Department. During the study period 47 macrosomic babies were delivered , so equal number of controls were recruited. Cases and controls were divided as Group A and Group B respectively. Mothers giving birth to babies 4000 gm and above at term gestational age were selected as cases where next delivery following a case without macrosomia weighing between 2500-3999 gm was considered as control. Pregnancy with mal-presentation, preterm labour, multi-fetal gestations, congenital malformations and intra uterine fetal deaths were excluded from the study. Demographic data including.

Statistical Analysis :

The data was entered in the Microsoft Excel spreadsheet and the final analysis was done using Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 21.0. Categorical variables were presented in the form of number and percentage (%) and quantitative variables were presented as the means ± SD and median with 25th and 75th percentiles (IQR = Interquartile Range) and range. The univariate logistic regression method was used to calculate odds Ratio as well as to identify significant associations of various risk factors and outcomes of Macrosomia. P value of less than 0.05 was considered as statistically significant.

Result Analysis :

Group A (cases) and Group B(controls) were comparable to each other on the basis of demographic variables including age, parity, gravidity, religion and residence (Table 1). Risk factors for macrosomia (Table 2) were compared with controls and both pre-pregnancy BMI and maternal weight gain during pregnancy were found to be independent risk

Table 1 — *Demographic Parameters*

Parameters	Control (n=47)	Case (n=47)	ODD Ratio	Confidence Interval	P-Value
Age (mean±SD)	26(6)	28.8(4.7)	0.99	0.92-1.07	0.840
Religion :					
Muslim	23(48.9%)	26(55.3%)	1.29	0.57-2.90	0.840
Hindu	24(51.1%)	21(44.7%)			
Gravida :					
Primigravida	21(44.7%)	17(36.2%)	1.425	0.623-3.260	0.401
Multigravida	26(55.3%)	30(63.8%)			
Residence :					
Rural	36(76.6%)	34(72.3%)	1.25	0.49-3.17	0.271
Urban	11(23.4%	13(27%)			

Table 2 — *Comparison of Maternal Risk factors*

Parameters		Control (n=47)	Case (n=47)	ODD Ratio	Confidence Interval	P-Value
Pre-pregnancy BMI	Overweight (>25kg/m^2)	6 (12.8%)	35 (74.5%)	19.93	6.78-58.62	<0.001
	Underweight (<18kg/m^2)	41 (81.2%)	12 (25.5%)			
Maternal weight gain (Mean SD)		7.5 (1.2)	9.8 (1.8%)	2.98	1.86-4.77	<0.001
Gestational Diabetes Mellitus	Yes	7 (4.9%)	19 (40.4%)	3.88	1.44-10.45	0.007
	No	40 (85%)	28 (59.6%)			
Pregnancy Induced Hypertension	Yes	5 (10.6%)	10 (21.3%)	2.27	0.71-7.25	0.166
	No	42 (89.4%)	42 (78.7%)			
Mode of Delivery	Vaginal (Normal/Assisted)	28 (49.6%)	15 (31.9%)	3.145	1.349-7.299	0.007
	LUCS	19 (40.4%)	32 (68.1%)			
Prolonged Labour	Yes	2 (4.3%)	5 (10.6%)	2.68	0.49-15.56	0.254
	No	45 (95.7%)	42 (89.4%)			
Shoulder Dystocia	Yes	47 (100%)	46 (97.9%)	0.00	0.00-0.00	0.999
	No	0 (0%)	1 (2.1%)			
Post-partum Haemorrhage	Yes	47 (100%)	46 (97.9%)	0.00	0.00-0.00	0.999
	No	0 (0%)	1 (2.1%)			
Past history of Macrosomia (Multigravida)		n=26	n=30	5.14	1.00-26.58	0.050
	Yes	2 (7.7%)	9 (30.0%)			
	No	24 (92.3%)	21 (70.0%)			

factors for macrosomia to happen with strong statistical significance (p <0.001). Higher incidence of gestational diabetes (p=0.007) was found among cases, however incidence of hypertensive disorders in pregnancy was not significantly raised. Operative morbidity rate due to caesarean delivery was very high among cases (p=0.007) when compared with that of vaginal delivery including both normal and assisted vaginal deliveries. Incidence of other maternal complications like prolonged labour during second stage of labour, post-partum haemorrhage, shoulder dystocia was marginally high in Group A without statistically significance. Clinical information and medical records showed incidence of macrosomia in previous pregnancy among multi parous mothers in case group was higher and just at the level of statistical significance with p value=0.05. Neonatal complications (Table 3) including Apgar scores at 5minute and 7 minute, Sick New-born Care Unit (SNCU) admission, perinatal asphyxia, neonatal death were comparable without statistical significance between two groups except higher rate of neonatal hypoglycaemia among macrosomic babies (p=0.010).

Discussion

Macrosomia, defined as birth weight 4000 gm or above with a prevalence rate of 10% worldwide was found to be associated with adverse maternal and neonatal complications as reported in multiple studies but no clear recommendations from professional bodies regarding management and plan of delivery were made yet probably due to ineffective antenatal measures to predict macrosomia, the inadequate evidence about appropriate management and the significant variation or heterogeneity in the literature regarding exact estimates of maternal and fetal complications[8-10,11]. Macrosomia is a related term and its diagnosis is based on an absolute birth weight threshold where gestational age , ethnicity are not considered but the term large for gestational age/ LGA (refers to an infant born above the 90th/95th percentile for weight at gestational age) reflect a better information about growth pattern according to gestational age and it takes into account ethnicity additionally, depending on the population or growth charts used to calculate growth centiles[1,8]. Harvey et al. evaluated risk factors in Asian countries and reported high pre-pregnancy BMI is strongly associated with subsequent occurrence of macrosomia/LGA in their meta analysis[2]. We too found high pre-pregnancy BMI as an independent predictor for macrosomia in subsequent pregnancy. Recurrence of macrosomia among multiparous women was at significance level (p=0.05) in our study. This similar finding was reported by many studies probably due to elevated BMI at the time of conception and increased weight gain during pregnancy and in between pregnancies[12-16]. Several randomised trials reported maternal hyperglycaemia increases the chance of fetal macrosomia similar to our study where we found 40.4% participants in case group were affected with diabetes while compared with controls (p=0.007)[17-20]. In our study operative morbidity was significantly increased (p=0.007) and 68% mothers in group B underwent CS while intra-partum complications like prolonged second stage of labour, shoulder dystocia, post partum haemorrhage were not significantly raised. This was probably due to the reason, the study was done in a referral centre where decision of CS was made much earlier for labor complications before onset of second stage of labour in emergency situations nullifying the chance of those labor complications. Said et al also reported 61.1% CS rate to deliver macrosomic fetus[12] in their study. The only significant neonatal complication while comparing with controls in our study was neonatal hypoglycemia (p=0.10). Such metabolic disturbance is 3 times common in new-borns with birth weight equal or above 4000 gm[4]. Limitation of our study was poor sample size over a short period of 1.5 years only. However we tried to find out feto-maternal complications in pregnancies with macrosomia fixing the gestational age at term. Literature reported highest

Table 3 — *Neonatal Outcome Comparison*

Parameters	Control (n=47)	Case (n=47)	ODD Ratio	Confidence Interval	P-Value
Apgar Score 1 min (SD)	6.95 (1.1)	7.02 (1.1)	1.06	0.73-1.53	0.226
Apgar Score 5min (SD)	7.98 (1.1)	8.04 (1.1)	1.06	0.73-1.55	0.770
Birth Asphyxia :					
No	40 (85%)	41 (87.2%)	1.19	0.37-3.86	0.765
Yes	7(14.9%)	6 (12.8%)			
SNCU Admission :					
Yes	4 (8.5%)	7 (14.9%)	1.88	0.51-6.91	0.341
No	43 (41.5%)	40 (85.1%)			
Neonatal hypoglycemia :					
Yes	2 (4.3%)	12 (25.5%)	7.71	1.62-36.74	0.010
No	45 (95.7%)	35 (74.5%)			
Perinatal death :					
Yes	0 (0%)	2 (4.3%)	0.00	0.00-0.00	0.999
No	47 (100%)	45 (95.%)			

prevalence of macrosomia (>10%) was in China and Pakistan where highest prevalence of LGA was found in China, Bangladesh, India, Japan, Thailand and Vietnam and if we consider the latter countries, they traditionally experience higher prevalence of low birth weight or small for gestational age at term. Such data reinforce the assumption that countries affected with low birth weight problem might suffer from consequences of high birth weight births as well[2,20]. So we need larger trials or analytical studies involving bigger sample size over prolonged period of time specially in Asian zones where data are sparse because it accounts for 60% of World's population and many of its countries including India are undergoing rapid economical changes necessitating to find out the exact incidence of macrosomia /LGA in these countries to implement preventive measures.

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Original Article

Custody Deaths Autopsied in Northeast Delhi Region : A 5-Years Retrospective Analysis

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Abstract

Background : On hearing custodial death, thought comes to the mind in most of us, is injustice and abuse of power and refers to the demise of an individual occurring while an individual is under the custody. It's the duty of state is to provide healthcare to their citizen including those in custody.

Materials and Methods : To find the trend, a retrospective autopsy-based study on death in custody was conducted in Northeast Delhi region for duration of five years (2019 to 2023).

Results : A total of 9653 medico legal autopsies were conducted during the study period, in which 3.6%(n=83) involves custodial death. Male predominance 93.9%(n=78) was seen over female 6.1%(n=5). Majority of custodial deaths belonged to the age group of 21 to 30 years. Natural causes like septic shock, disseminated tuberculosis, cardiovascular diseases etc accounts majority 72%(n=65) cases. Among unnatural cause 21.6%(n=18), from suicide10.8%(n=9), due to violence 7.2%(n=5), due to accident 4.8%(n=4) was observed.

Conclusion : Mandatory medical investigation and screening while during a person into custody and periodical health checkup with proper and timely medical care will prolong the lifespan and overall health status among the person in custody. As we are part of society, we need to work towards creating more humane and equitable systems of justice and healthcare that uphold the fundamental rights and dignity of all individuals, both inside and outside of prison walls.

Key words : Custodial Death, Jail Death, Asylum Death, Charity Home Death.

The duty of state is to provide healthcare to their citizen including those in custody under 'Article 21 of the Indian Constitution, 1950' which emphasises that no one can be denied his right to health. Before the law, every person is equal which is similar to other nations for imposed legal obligations on states to uphold these right and personal liberty[1].

On hearing custodial death, thought comes to the mind in most of us, is injustice and abuse of power, refers to the demise of an individual occurring while an individual is under the custody or control of law enforcement, correctional facilities, or other authorities.This occurrence, tragically prevalent in many countries worldwide and in India, represents a grave violation of human rights and threaten the principles of justice and accountability.

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Editor's Comment :

- Ensuring mandatory medical screenings and periodic health check-ups for individuals in custody is not only a legal obligation but also a morally indispensable.
- By advocating for humane and equitable systems, we contribute to the well-being of all members of society, which uphold the fundamental rights and dignity of all individuals, both inside and outside of prison walls.

Addressing the issue of custodial death put forth extremely challenging and difficult for Governments, civil society organizations and the international community alike. These challenges include extensive criminality of offenders, inadequate access to justice and redress for victims and their families, lack of transparency and accountability within law enforcement agencies, and a conspiracy of silence and complicity surrounding cases of abuse. Moreover, the socio-political circumstance in many countries, characterized by political quashing, corruption and weak institutional ability, further complicates efforts to combat custodial death effectively.

There are also a possibility of false allegations of violation of human rights by prisoners on law enforcement authorities and few studies shown that there is increased morbidity and mortality with natural

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deaths with the individual is under the custody[2,3]. Although natural death is unavoidable, with adequate care and necessary treatment, disease progression can be controlled and that requires proper planning and allocation of resources which in-turn requires data regarding natural and unnatural manner of death in the custody.

Through analysing the complexities surrounding custodial death, this exploration aims to enrich greater understanding and action towards preventing further loss of life and upholding the fundamental rights of all individuals, regardless of their circumstances or legal status. This study also limelight the stake holders on pattern for planning preventive measures and awareness programs based on the past learning of their particular geographical area.

Materials and Methods

The present study was conducted retrospectively at the Department of Forensic Medicine & Toxicology, University College of Medical Science & GTB Hospital, University of Delhi. Altogether 83 cases of custodial death were identified during this study period over the last five years. Relevant data such as age, sex, cause of death, manner of death, place of death, any pre-existing illness, etc were gathered from post-mortem examination reports and other legal documents on custody-related deaths during the period from year 2019 to year 2023.The data were tabulated, then analysed and compared with previous similar study done in national and international in past.

Observation and Results

A total of 9653 medico legal autopsies were conducted in our institute during the study period, in which 3.6%(n=83) involves custodial death. Male predominance of 93.9% (n=78) and female 6.1% (n=5) were observed with p-value is 0.002891 and the result is significant. Also, most of the death occurred in hospital stay and ongoing treatment. (Tables 1 & 2).

The most common age group among deaths in custody was 21-30 years of 37.3% (n=31). A majority of deaths occurred in due to natural causes with the p-value 0.035729 showing significant result (Table 3).

The maximum number of custodial death was reported in month of June 13.2% (n=11) and November 12% (n=10). In majority cases, post-mortem interval was observed one day 27.7% (n=23). Among cause of death, septic shock and disseminated Tuberculosis leads the top by 23% (n=15) and 17% (n=11) respectively. Breathing difficulty and altered sensorium were the most common symptoms observed in present study and Tuberculosis 21.6 % (n=18) and hypertension 14.4% (n=12) were top in the list of pre-existing diseases (Tables 4 & 5).

Table 1 — *Year and Sex Distribution*

Death in Years	Male Death	Female Death
2019	17	0
2020	10	0
2021	18	2
2022	17	3
2023	16	0
Grand Total	78	5

Table 2 — *Place Distribution*

Place of Death	Count
Brought Dead	13
Custodial Death	27
Hospital Dead	42
Police Station	1
Grand Total	83

Majority of death reported in jail were Central Jail, Mandoli, Delhi 63.8% (n=53), Dasna District Jail, Ghaziabad, Uttar Pradesh 18% (n=15). Where as in police cell death contribute five cases and while transfer two prisoner committed suicide by jumping from height. Asylum death of three cases, de-addiction centre and charity home death one case each observed in present study (Table 6).

Discussion

According to the most recent Prison Statistics India-2022 published on December 1, 2023 by the National Crime Records Bureau, as of 31st December, 2022,

Table 3 — *Age and Manner Distribution*

Age	Male		Female		Total
	Natural	Unnatural	Natural	Unnatural	
10 to 20	1	0	0	0	1
21 to 30	17	12	1	1	31
31 to 40	11	3	1	1	16
41 to 50	12	1	0	0	13
51 to 60	10	0	0	0	10
61 to 70	10	0	1	0	11
71 to 80	1	0	0	0	1
Total	62	16	3	2	83

Table 4 — *Top 10 Symptoms Prior to Death*

Symptoms	As A Primary Complaint	As A Secondary Complaint	Total
Abdominal Pain	2	-	2
Altered Sensorium	6	1	7
Breathing Difficulty	19	5	24
Chest Pain	5	1	6
Cough	2	1	3
Fever	3	3	6
Hanging	6	-	6
Loss Of Conscious	6	-	6
Lung Infection	4	1	5
Public Beating before Arrest for Theft / Crime	2	-	2

Table 5 — *Count on Chronic Illness*

Pre-existing Diseases	Count
Tuberculosis	18
Hypertension	12
Diabetes Mellitus	7
Hepatitis C Virus	7
Chronic Obstructive Pulmonary Disease	6
Kidney Disease	5
Coronary Artery Disease	4
Liver Disease	4
Human Immunodeficiency Viruses	4
Both Hypertension and Kidney Disease	4
Both Coronary Artery Disease and Diabetes Mellitus	2
Both Tuberculosis and Chronic Obstructive Pulmonary Disease	1
Hepatitis C Virus	1

Table 6 — *Count on Location*

Location of Custody	Count
Jail	71
Police cell	5
Asylum	3
De- Addiction centre	1
Charity home	1
While Transfer - Jail to court	2
Grand Total	83

in 1330 prisons all over India had 5,73,220 prisoners with occupancy rate of 131.4%. In which Delhi, Uttarakhand, Uttar Pradesh had top three occupancy rates 185.5%, 183.3% and 179.9% respectively. Based on gender 5,49,351 were male, 23,772 were female and 97 were transgender prisoners. The maximum number of prisoners belongs to age group of 18-30 years followed age group 30-50 years and above 50 years with proportion of 44.7%, 42.5% and 12.8% respectively. The total number of deaths among the prisoner in custody for the year 2022 were 1995, in which 1773 (88.9%) by natural causes, 159 (8.0%) by un-natural causes includes suicide and 63 death cause yet unknown. Uttar Pradesh reported highest deaths both in natural and un-natural category[4].

Person under custody might face many sorts of psychological, physical and at times sexual abuse. Some cases result from excessive use of force by authorities or carelessness, or even intentional injury done to the inmate. It can occur during interrogation, arrest or transportation of suspects. The prevalence of unnatural manner of custodial death goes beyond geographical boundaries, affecting individuals from dissimilar socio-economic backgrounds, marginalized communities and minorities.

In India custodial death is to be testified within 24 hours, in which inquest is conducted by Magistrate as per CrPC 176 and this section has been replaced by 196 of BNSS 2023. Medico-legal autopsy will be conducted by constituting medical board of doctors and entire autopsy proceeding is properly video recorded following standard operation procedure and guidelines of National Human Right Commission {NHRC} of India.

The present study retrospectively analysed 83 cases, which reveals that the males were commonly affected which is also consistent with the findings of other studies done nationally[5-9] and internationally[10-17]. It shows the gender-based aggression and exposure to criminal behaviour of male comparatively with female population. The age group shown higher death in age group 21-30 years 37% (n=31) followed by age group 31-40 years which is similar with other studies[6,9,18,19].

The majority of the death occurred due to natural causes 72% (n=65) showing statistically significant results (p-value of 0.035729). Results of present study coincide with the studies done by various authors[5-9,15,20-26]. Among the natural cause, most common cause of death was septic shock 23% (n=15) followed by disseminated tuberculosis 17% (n=11) and cardiovascular diseases 11% (n=7). These natural causes are mostly either preventable or treatable with efficient healthcare interventions.

On comparison of this study with both national and international studies, the proportion of unnatural death has come down drastically and able to appreciate the changing trend because of effort taken by members of the society more than several decades but still there were the rooms for improvement (Table 7).

In present study, unnatural deaths reported 21.6%

Table 7 — *Comparison of present study with Various National and International Studies*

Citation	Study Country	Year	Gender Dominance	Common Age Group	Manner of Death (MC)
13	Australia, Victoria	2000	Male 93.7%	Mean 34.6 Years	Unnatural,81.2%
14	Canada, Ontario	2002	Male 97.2%	Mean 40.9 Years	Unnatural, 59%
19	South Africa	2003	Male 100%	21-30 years	Unnatural, 98.2%
18	India, New Delhi	2008	Male 100%	21-30 years	Unnatural, 76.9%
20	India, Maharashtra	2008	Male 98%	31- 40 years	Natural, 68%
7	India, Chandigarh	2010	Male 95%	46-55 years	Natural, 89%
22	Pakistan, Karachi	2010	Male 95.1%	30-39 years	Natural, 59%
15	UK	2011	Males 72%	21-50 years	Natural,66%
23	Turkey, Istanbul	2012	Male 98.4%	Mean 40.9 years	Natural 83.2%
6	India, Patiala	2014	Male 96.6%	21-30 years	Natural, 92.5%
25	Malaysia,Seremban	2015	Male 96.51%	21-50 years	Natural 84.88%
21	India, Punjab	2016	Male 88.1%	26-35 years	Natural, 95.65%
9	India,Patiala	2017	Male 92.5%	21-40 years	Natural, 81.6%
8	India, Yavatmal	2018	Male 97.2%	41–50 years	Natural 69.44%
5	India, Jamnagar	2019	Male 95%	31-40 years	Natural, 70%
24	Nigeria, Uyo	2021	Male 100%	22-44 years	Natural, 44.4%
-	Present study (India, NE Delhi)	2023	Male 93.9%	21–30 years	Natural, 78.3%

(n=18) of total cases out of which 10.8% (n=9) cases chosen suicide. Most common method of suicide used by hanging (n=7), in that one case was police guard; he hanged in his police station. Other unnatural causes were fall from height (n=2), death due to violence (n=5), in which public beating before arrest was two cases, another two cases on interrogations in police station and one case by physical assault among inmates. Death due to accident 4.8% (n=4), in which drug abuse / over dose death was 3.6% (n=3), accidental fall 1.2% (n=1). This shows the inefficiency of custodian, breach in duty by lack of monitoring and ignorance, leading to access of prohibited substance inside the custody.

In this study majority of death occurred where under the custody of prison was 86.7% (n=72), in police cell 7% (n=6), in mental health facility 4.8% (n=4) and Missionaries of charity home 1% (n=1). Among the death in prison was vastly from central jail in Mandoli, Delhi 63.8% (n=53).

Conclusion

In conclusion, prisoner's health represents a complex and multifaceted issue with far-reaching implications for individuals, communities, and society as a whole. By understanding the challenges and disparities faced by incarcerated individuals, there is requirement for prioritizing their healthcare needs. In the present study, custody deaths occurred mainly due to natural cause or illness. Basically, prisoners frequently have an extensive variety of health issues as a consequence of factors like socio-economic disadvantage, substance abuse, mental illness and inadequate access to healthcare both before and during incarceration. Moreover, the prison environment itself can exacerbate existing health issues and expose individuals to additional risks, including infectious diseases, violence and poor living conditions. As a result, prisoners have disproportionately higher rates of chronic and infectious diseases, mental health disorders, and substance abuse disorders compared to the general population.

By following NHRC recommendation, to undergo medical investigation and screening while taking a person into custody and periodical health check up with proper and timely medical care will prolong the lifespan and overall health status by reducing morbid and mortality among them. As we are part of society, we need to work towards creating more humane and equitable systems of justice and healthcare that uphold the fundamental rights and dignity of all individuals, both inside and outside of prison walls.

Limitations

The limitations of the study include its focus on a specific region and time period. It relies on data from a single institute, lack of information at the individual level and absence of exploration of potential demographic differences or changes over time.

Ethical Committee Report :

Basically this study was a data based retrospective study. As per college guidelines, there was no need

to take ethical clearance from the committee for this study.

Conflict of Interest : None to declare.

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Original Article

Psychological Effect of Workplace Violence among Nurses in a Tertiary Care Teaching Hospital of Northern India — A Cross-Sectional Study

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Abstract

Background : Workplace violence is a significant social problem and is higher in the service sector including health care delivery.

Materials and Methods : The current cross-sectional study on 290 nurses of both genders was done in 2020 at a teaching hospital, in Delhi, India. The emotional disturbances in four main domains were assessed on a five-point Likert scale for each type of violence separately if an individual had undergone more than one type of violence.

Results : The affect scores were significantly lower for male victims of physical violence than for females. One person had faced sexual violence and his total affect score was 84% of the total score. A higher mean affect score was seen among victims of bullying.

Conclusion : Workplace Violence in the healthcare sector also causes psychological effects among nurses. Hence, institutional level policies are required in place to prevent and manage WPV and its emotional effects.

Key words : Workplace Violence, Healthcare System, Nurse, Psychological Effects, Harassment, Bullying.

Workplace violence (WPV) is defined as any act or threat of physical violence, harassment, intimidation, or other threatening disruptive behavior that occurs at the work site, by a person related to the workplace[1]. Service sector employees particularly those in the healthcare industry, often face a higher risk of WPV. This unfortunate trend highlights the vulnerability of healthcare providers to such incidents. In the health sector, the perpetrators are often patients in their care[2]. Nurses all have closer and longer patient contact and are proportionally at higher risk of WPV[3]. The higher prevalence in the health sector can be due to manpower deficit, longer duration of work, dealing with sensitive issues, resource constraints, and misinformation about disease treatment available on the internet and mass media.

Editor's Comment :

- Workplace violence is prevalent among nurses, with verbal abuse being the most common, followed by bullying and physical violence, all of which have significant psychological impacts.
- Bullying caused the highest emotional distress, while female nurses experienced greater effects from physical violence compared to males. These findings highlight the urgent need for institutional policies to prevent WPV and support affected healthcare workers.

Apart from the direct physical effects of WPV, psychological disturbances or after-effects including fear, anxiety, anger, insecurity, emotional exhaustion, suicidal thoughts, post-traumatic stress symptoms, guilt, or poor sleep quality are also seen[4]. Chronic Workplace Violence might lead to or in some cases, a single incident can trigger psychological disturbances resulting in burnout, depression, increased mental distance from one's job, feelings of negativism and reduced professional efficacy[5,6]. Various barriers to reporting WPV, especially among nurses, have been identified and these include a healthcare culture that considers WPV part of the job or routine, lack of agreement on what is a WPV, etc[7,8]. Though literature is available on the occurrence and risk factors, the psychological consequences of WPV are less commonly explored. Understanding the profound emotional aftermath of Workplace Violence is crucial for organizations to

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implement effective support systems and preventive measures as well as to improve healthcare delivery and patient satisfaction. Therefore, the present study was conducted to estimate the psychological effects of WPV among nurses in a Tertiary Care Teaching Hospital in Northern India.

Materials and Methods

A cross-sectional study was conducted in 2020 to questions from the "WPV in the health sector country case studies research instruments survey" questionnaire. The study was conducted in one of the biggest Tertiary Care Teaching Hospitals in Delhi, India which had about 2500 nurses employed at the time of the study. Both male and female nurses employed for a minimum period of 6 months in the institute were included in the study. The sample size was calculated by using the formula for proportions ie, $Z_{(1-\langle\alpha/2)}{}^2 pq/l^2$, taking p as 0.45 as the prevalence of Workplace Violence among nurses from the study conducted by Thomas, *et al*[9], in Wardha, Maharashtra in 2019, the absolute error of 6% and a non-response rate of 10%, the sample size calculated was 290. Department-wise stratified proportionate sampling was done, in which the total sample of 290 was obtained from 23 departments/strata. The samples from each strata was in proportion to the Departments share in the total population of nurses, ensuring nurses working in different duty hours were included. WPV was operationally defined as those in which all the parties involved are associated with the workplace either directly or if one of the parties is affected for being a part of the workplace. In addition to the demographic data, among the victims of WPV, the emotional trauma they faced due to physical or verbal or sexual violence and bullying was captured individually on a five-point Likert scale (0=Not at all, 1=Little bit, 2=Moderately, 3=Quite a bit and 4=Extremely). The total score for each type of violence ranged from 0-16. Data was entered in MS Excel, cleaned for errors, and analyzed using SPSS version 21.0. due to incomplete information in 7 forms only 283 were included for further analysis. Descriptive analysis (Mean ± SD, median(IQR), frequencies and percentages) was performed. The total affect scores for each type of violence and the total scores were not normally distributed when checked using kolmogrov-smirnov test and Shapiro-Wilk test. Permission to conduct the study was obtained from the Institute Ethics Committee of the hospital (IEC/VMMC/SJH/Project/2020-01/CC). Written informed consent was obtained from each study participant. Privacy and confidentiality of data was ensured.

Results

The analysis was conducted among 283 nurses of various Departments, of which the majority were females (201, 69.3%) and were in the age group of 20-29 years (126, 43.4%) followed by 27.2% in the 30-39 years age group. In the last 12 months a higher proportion were subjected to verbal violence (82, 28.3%), than bullying/ mobbing (15, 5.3%) or physical violence (12, 4.2%). One person was subjected to sexual violence.

Among the participants who faced WPV, the mean affect score was highest for bullying (Mean ± SD) followed by physical (Mean ± SD) and verbal WPV (Mean ± SD). For physical WPV, the mean affect score was significantly greater for females (12±SD) compared to males (7±SD). No such association was observed between gender and mean affect score for verbal WPV (M- 8.1, F-7.3) and bullying (M- 9.5, F-7).

The affect scores for disturbing thoughts and avoiding thoughts/talk were higher for bullying than the other forms of violence. The victims of physical and verbal WPV were more likely to be super alert or watchful and on guard while victims of bullying were more likely to avoid thinking about or talking about the violent incident or avoiding having feelings related to it compared to other affects (Table 1). There was no statistical correlation observed between age or years of experience with the total affect scores of each type of violence. Among those subjected to verbal harassment people of younger age group significantly had higher affect scores than older people. The affect scores did not differ for any other harrament across age group, gender, marital status, work experience, night or day shift work, or the type of job(permanent/ contractual)(Table 2). The average median affect score for those affected by only one(64/283), two(15/283) or three(5/283) types of violence was 8(5-11), 8.5(5.5-10.5) and 9.3 (7.8-10.5) respectively. Though the average median score increased with the number of violence this was not statistically significant.(p=0.8, Mann-Whitnet U test).

A higher proportion of victims of physical violence, (41.7%, n=5) became extremely watchful thereafter compared to victims of other forms of WPV. The majority of the physical (75%) and verbal WPV (78%) victims could not avoid thinking/talking about it. About one-fourth of physical violence and bullying victims felt extremely that everything they did was an effort. All the victims of bullying had repeated disturbing thoughts, were not able to avoid thinking about the attack and

Table 1 — *The mean affect scores for victims of each type of Violence*

Affect variables	Mean ± SD score		
	Physical (n=12)	Verbal (n=82)	Bullying (n=15)
Domain-specific total	8.5 ± 2.9	7.8 ± 3.9	9.1 ± 4.1
Repeated, disturbing memories, thoughts, or images of the attack?	1.6 ± 1.4	1.4 ±1.2	2.1 ± 1.1
Avoiding thinking about or talking about the attack or avoiding having feelings related to it?	1.7 ±1.2	1.8 ± 1.3	2.5 ± 0.9
Being "super-alert" or watchful and on guard?	2.8 ±1.2	2.5 ± 1.3	2.3 ± 1.0
Feeling like everything you did was an effort?	2.4 ±1.4	2.1 ± 1.2	2.2 ± 1.5

Table 2 — *Median affect scores across different subgroups*

Employment		Physical Violence		Verbal		Bullying	
		Frequency	Median (IQR)	Frequency	Median (IQR)	Frequency	Median (IQR)
Age	30 years and less	9	9(7-12)	47	9 (6-11)	10	5 (5-12)
	More than 30 years	3	6 (4-6)	35	6 (3-10)	5	5(5-12)
	p value*		1		**0.03**		0.2
Gender	Female	8	8.5(4.5-9.8)	57	7 (5-10)	9	8 (5-11.5)
	Male	4	11 (7-12)	25	10(6-12)	6	11.5 (5-13)
	p value*		0.2		0.35		0.31
Work experinece	5 years and below	6	10.5(5.5-12)	38	9 (5-10)	5	8 (5-11.5)
	More than 5 years	6	8.5(5.5-10)	44	7(5-11.75)	10	9.5(5-13)
	p value*		1		0.19		1
Marital status	Married / with partner	6	11(5.5-12)	53	7(5-11.5)	8	9.5(5-14.75)
	Single/Divorced/Unmarried	6	8.5(5.5-9.25)	29	9(6-10)	7	8(5-12)
	p value*		0.24		0.34		1
Night shift	Yes	10	9 (5.5-12)	63	8(5-11)	12	9.5(5-12)
	No	2	8 (6-8)	19	8 (4-11)	3	8 (5-8)
	p value*		1		0.8		1
Job type	Contractual	3	10(6-10)	8	9(5.25-10.75)	2	8(5-8)
	Permanent	9	9(5-11)	74	8(5-11)	13	8(5-12)
	p value*		0.52		0.87		1

*Mann-Whitney U test

became super alert thereafter. All the victims of physical violence and bullying/ mobbing were affected by either one of the four psychological aftereffects. About 4.8% of the verbal violence victims were not affected by any of the psychological effects assessed.

The victim of sexual harassment pretended that it never happened and did not talk about it to friends/ family/ colleagues, did not report it to any seniors, or asked for a transfer to another position. The total affect score for sexual WPV was 13.5.

Discussion

The distress caused by Workplace Violence, at the individual level, may reduce job productivity and increase burnout. This in turn will affect the entire healthcare delivery system. The findings of the study shed light on the prevalence and aftermath of Workplace Violence (WPV) among nurses in various departments. In the realm of verbal workplace violence, much like the diminished affect scores observed among males in our research, a study focusing on flight attendants revealed that males exhibited lower levels of depression[10]. Though not statistically significant, both studies involved a cohort with a higher female workforce.

In the current study, the mean score for avoidance of talk was lower at 1.7 and 1.8 for physical and verbal violence. A report on violence against doctors reported more than 60% took leave from work following WPV[11]. These factors indicate that nurses or health care workers must be made aware of the hospital policy against Workplace Violence. According to a study in Switzerland, 7.6% of the participants knew institutional policy against Workplace Violence[12]. This also reflects an untrusty working environment in the healthcare system.

A systematic review also showed that psychological effects including post-traumatic stress disorder, mental exhaustion, and emotional distress followed WPV[13]. Though bullying appears to be the lower end of the spectrum of WPV, all of its victims, faced after-effects emotionally and had the highest mean affect score(excluding sexual violence). However, the susceptibility to the after-effects of any violence is based on various factors including the vulnerability

of the victim. Though not significant, the affect scores for both physical and verbal violence were lower among people of higher age group suggesting the established fact that people handle workplace problems better as they become older. Similarly, females had lower affect scores than men in all three types of violence though not statistically significant. Though affect response is theoretically studied to differ across genders, the study by Fischer AH, *et al*[14] on large community sample[15] also in accordance with the current finding did not reveal any difference. Affect scores are statistically comparable across most of the varibles, indicating that emotional affect may differ on individual basis and is difficult to predict its determinants. Further research should be carried on to understand the degree and determinants of the psychological impact of Workplace Violence.

The lack of clear definitions for the psychological effects of violence and the violence itself including bullying, and sexual harassment have all made it difficult to identify after effects with certainty. Though conducted based on a scientific methodology, the study has its limitations. The sample size for assessing the effect of WPV was small and was initially calculated for the parent study on the prevalence of WPV. Hence, the results of subgroup analysis have to considered with caution. The interpretations of the study have to be generalized with caution as this is a single center-based study where an established Internal Complaints Committee was functioning well.

Conclusion

The differential impact of various forms of violence on psychological well-being emphasizes the need for tailored interventions. The prominence of disturbing thoughts and avoidance in bullying cases calls for targeted mental health support for these victims. The findings underscore the importance of addressing Workplace Violence comprehensively, considering both preventive measures and post-incident support systems. While the study sheds light on the negative consequences of workplace violence, it is equally important to highlight positive findings. Identifying coping mechanisms and resilience factors among those who have experienced violence could inform the development of support programs. Hence, policymaking at the institutional level should be focused on a safer environment for the prevention of WPV, the ability to cope with the effects of WPV, and to identify distress among employees/colleagues.

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Original Article

The Success of Combined Trabeculotomy and Trabeculectomy in Patients with Primary Congenital Glaucoma Presenting to a Tertiary Care Centre

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Abstract

Background : To find out the surgical success of combined Trabeculotomy with Trabeculectomy in patients with Primary Congenital Glaucoma in the population of Eastern India.

Materials and Methods : It is an institution based, prospective, interventional study where 30 consecutive eyes from 25 patients were taken over a period of 18 months at a Tertiary Care Hospital of Eastern India. Diagnosis was made clinically and EUA was planned. Intra-ocular pressure, corneal diameter, axial length were measured and disc evaluation was done. Combined Trabeculotomy and Trabeculectomy was performed. The same four parameters were measured at the end of 1 month, 6months, 12 months and 18 months post operatively.

Results : A significant reduction of IOP from 28.87±4.47 mm Hg to 12.33±1, 15.68±3.95, 17.95±3.21 and mm Hg at 1 month, 6 months, 12 months and 18 months respectively was seen ($p<0.0001$). 60% of all eyes showed complete success while 20% had qualified success. Patients presenting late had poorer prognosis. Axial length and cup disc ratio show significant reductions ($p<0.05$).

Conclusion : Primary combined Trabeculotomy-Trabeculectomy is safe, effective, and sufficiently predictable to be considered the first choice of surgical treatment in Primary Congenital Glaucoma.

Key words : Trabeculectomy, Combined Trabeculectomy, Primary Congenital Glaucoma.

Primary Congenital Glaucoma (PCG) is a condition where there is impaired drainage of aqueous humour due to defective development of the trabecular meshwork (Trabeculodysgenesis). This results in a raised Intraocular Pressure (IOP) and eventual optic nerve damage[1]. The prevalence of Primary Congenital Glaucoma (PCG) is one in 3,300 live births and PCG accounts for 4.2% of all childhood blindness in Indian population[2]. As such, surgical approach is considered to be the first line treatment modality and should be performed as early as possible[2]. There are two main approaches, ab-interno approach ie, Goniotomy and ab-externo approach ie, combined Trabeculotomy with Trabeculectomy. A Goniotomy is a simpler procedure but it requires a clear cornea to visualize the angle structures[3,4]. Most of the cases of Congenital Glaucoma that presents to our OPD, presents with varying degree of corneal haziness[2]. As a result, combined Trabeculotomy with Trabeculectomy (trab-o-trab) is our preferred approach[5].

Editor's Comment :

- Combined Trabeculectomy with Trabeculotomy is the one of the most widely performed surgeries for childhood glaucoma and the surgeon should individualize his treatment plan to tailors to each child's unique requirements.
- As children have a good healing response, Trabeculectomy combined with Trabeculotomy for childhood glaucoma provides a dual outflow through Schlemm's canal and Trabeculectomy fistula and thus it increases the success rate.

Materials and Methods

30 eyes from 20 patients were selected and followed up for a period of 18 months. The diagnosis of Primary Congenital Glaucoma was made after doing an

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Examination Under General Anaesthesia (EUA) where Intraocular Pressure (IOP) and Corneal diameter were measured and Fundoscopy done. When a child presented with the features of photophobia, blepharospasm or epiphora and had the signs of bupthalmos and corneal oedema, we suspected it to be a case of Congenital Glaucoma and performed a B-scan Ultrasonography to measure the axial length of the eyes and prepared the patient for the EUA.

Anaesthesia was administered by inhalational route. Propofol (1.5-2mg/kg) is used for induction. Sevoflurane, Pentazocine and Atracurium were used for maintenance of Anaesthesia. Vertical and horizontal corneal diameters were measured with a Castroviejo's callipers. IOP was measured by hand held Perkin's Tonometer and/or Tonopen. Disc evaluation was done by direct and indirect Ophthalmoscopy. Corneal characteristics like Haab's stria and Corneal oedema was determined under microscopic examination along with other ocular abnormalities to rule out Secondary Congenital Glaucoma. If diagnosis of Primary Congenital Glaucoma was stamped, patient was taken up for combined Trabeculotomy with Trabeculectomy (trab-o-trab) procedure in the same sitting. A cycloplegic refraction was also done.

In this procedure, after doing a limbal based peritomy and cautery of the scleral bed, a partial thickness 4.0mm x 4.0mm rectangular scleral flap is created. A point on the limbo-scleral junction is selected based on position of drainage of episcleral vein and that point is incised. Entry into Schlemm's canal is confirmed by gush of fluid mixed with blood. One limb of the Harms trabeculotome is introduced through that opening and advanced along the length of the Schlemm's canal and it is brought into the anterior chamber by a centripetal pull thereby incising 180 degree of the canal. The same is done for the other 180 degrees.

A side port entry is made and intracameral pilocarpine (0.5%) instilled to constrict the pupil, anterior chamber is formed by injecting viscoelastic substance. AC is entered with a keratome blade and trabecular meshwork under the scleral flap is punched with a trabecular punch. A surgical Iridectomy is done. Scleral flap is sutured with 10-0 MFN and conjunctiva is sutured with 8-0 vicryl. Patency of Sclerostomy and bleb is checked by injecting BSS into the AC.

The patients were followed up at 1 month, 6 months, 12 months and 18 months respectively. Consecutive EUAs were performed and IOP, Corneal diameter, axial length were measured along with disc evaluation. Postoperative IOP between 6 and 20 mm of Hg was considered to be a success. Patients with IOP more than 20 mm Hg were put on additional anti-glaucoma medications. IOP control with up to two different AGMs were considered as "Qualified Success". The rest were labelled as Failure (Tables 1 & 2).

Results

The mean age of the sample population was (15.74±10.54) months. The youngest baby was of 3 months and the oldest was of 38 months.

The sex distribution shows a male preponderance with 63% of the patients being Males and 37% being Females.

The mean Pre-operative IOP was measured as 28.87±4.48 mm Hg. The mean pre-operative axial length was measured as 24.23±1.95 mm. The mean Pre-operative corneal diameter was 13.36±1.21 mm. The final Postoperative IOP after 18 months was 18.91±5.67 mm Hg which was a significant reduction ($p<0.00001$). The final Postoperative axial length was 22.53±2.40 mm which was also a significant reduction ($p=0.001958$). Mean Postoperative corneal diameter was 12.9±1.20 mm which did not show a significant reduction ($p=0.07$). Disc evaluation of 9 eyes were not possible due to varying degrees of media haziness. For the rest, the mean vertical cup disc ratio was 0.85±0.07. It showed a significant reduction to a mean of 0.4±0.11 at final follow-up ($p<0.00001$). Four eyes showed clearing of media as well.

Out of 30 eyes, 23 had presence of corneal oedema out of which 18 showed complete clearing of oedema following surgery. Ten eyes showed Haab's stria.

Table 1 — *Shows the success rate of the surgery via IOP as the main determining factor*

	1 month	6 months	12 months	18 months
Total	30	27 (90%)	24 (80%)	24 (80%)
Complete Success	30 (100%)	24 (80%)	19 (63.34%)	18 (60%)
Qualified Success	0	3 (10%)	5 (16.67%)	6 (20%)
Failure	0	3	6	6

Table 2 — *Showing mean anti-glaucoma medications requirement*

	1 month	6 months	12 months	18 months
Mean AGM	0	0.2±0.4	0.53±0.77	0.53±0.77

Postoperative complications included hyphaema (0.03%). But no sight threatening complication was noted.

Discussion

The primary objective during management of PCG is control of IOP. Mandal, *et al* has reported combined primary trab with trab having a higher incidence of successful control of IOP in the Indian patient population with a single procedure[6]. The safety and efficacy of this procedure has already been reported by studies done elsewhere in the world.

In India, Congenital Glaucoma is more frequent and more severe than in other parts of the World[7]. Over 80% of our patients present with severe cloudy cornea at birth and Goniotomy is technically impossible[6,7]. Similarly in our study we have found 77% of the cases presenting with Corneal oedema which makes Goniotomy impossible as the primary surgery.

Whether primary Combined Trabeculotomy-Trabeculectomy is superior to Trabeculotomy or Trabeculectomy alone is debatable. In a small series of seven Arab Bedouin infants with congenital glaucoma, Biender and Rothkoff[8] observed no difference between Trabeculotomy and combined Trabeculotomy-trabeculectomy. Dietlein, *et al*[9] investigated the outcome of Trabeculotomy, Trabeculectomy and a combined procedure as initial surgical treatment in primary Congenital glaucoma. Although combined procedure seemed to have a favourable outcome, the advantages of this procedure over Trabeculotomy or Trabeculectomy was not statistically significant after 2 years. Elder[10] compared primary trabeculectomy with combined Trabeculotomy-Trabeculectomy and found the combined procedure superior. The results of the present study are comparable to that reported by Elder[10] and better than the results of Goniotomy, Trabeculotomy or Trabeculectomy alone. The superior results of combined procedure may be because of dual outflow pathway[10]. Mullaney, *et al*[11] and Al-Hazmi, *et al*[12] used mitomycin-C in primary combined Trabeculotomy-Trabeculectomy and noted greater surgical failure with higher doses of mitomycin-C. Our results are comparable to Mullaney, *et al*[11] but we do not use mitomycin-C in primary surgery.

In our study we have found failure rates to be higher in those eyes that have presented at a later age. Incidentally those eyes show a relatively greater axial length and corneal diameter and as such they could be considered to be important determining factors for prognosis.

Conclusion

It can be concluded from this study that an early intervention in cases of Primary Congenital Glaucoma can lead to favourable outcomes. Also Primary Combined Trabeculotomy with Trabeculectomy is safe, effective, and sufficiently predictable to be considered the first choice of surgical treatment in Primary Congenital Glaucoma.

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Original Article

Assessing the Impact of CHA2DS2-VASc Score on Oral Anticoagulation Recommendations for Non-valvular Atrial Fibrillation Patients in the Indian Population

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Abstract

Background : Stroke is a major complication of Atrial Fibrillation (AF), often managed with oral anticoagulation to reduce associated morbidity and mortality. This study compares the CHADS2 and CHA2DS2-VASc scoring systems in guiding anticoagulation therapy in patients with Non-valvular Atrial Fibrillation (NVAF).

Materials and Methods : A total of 87 NVAF patients from a Tertiary Care Center in Pune were evaluated using ECG and Echocardiography. CHADS2 and CHA2DS2-VASc scores were calculated and oral anticoagulation was initiated based on the CHA2DS2-VASc score. Follow-up was conducted at 3 and 6 months to assess compliance and bleeding events.

Results : While CHADS2 recommended anticoagulation in 64% of patients, the CHA2DS2-VASc score increased this to 92%, reflecting a 28% higher identification rate. Eighty patients received oral anticoagulants. Discontinuation rates were 26% and 33% at 3 and 6 months, respectively. Minor bleeding was reported in 2.5% and 6% of patients at the same intervals.

Conclusion : The CHA2DS2-VASc score offers more precise recommendations for anticoagulation in NVAF, identifying a higher number of patients at risk of Stroke compared to CHADS2.

Key words : CHA2DS2-VASc, CHADS2, Atrial Fibrillation, Stroke Prevention, Anticoagulation.

Atrial Fibrillation (AFib or AF), is the most common type of treated heart arrhythmia. When the heart beats too slowly, too fast, or in an irregular way, the condition is called as arrhythmia[1]. An estimated, around 6-12 million people will suffer this condition in the US by 2050 and 17.9 million people in Europe by 2060[2]. However, epidemiological data reporting the actual incidence and prevalence of AF in India are scarce[3]. Overall prevalence of AF increases with age[4,5].

Editor's Comment :

- The CHA2DS2-VASc score identified more patients with Non-Valvular Atrial Fibrillation (NVAF) who needed oral anticoagulation compared to the CHADS2 score (92% *versus* 64%).
- This suggests that CHA2DS2-VASc provides clearer and more comprehensive guidance for initiating anticoagulant therapy to prevent stroke.

Stroke, as reported is one of the major complications of Atrial Fibrillation (AF) owing to significant morbidity and mortality[6,7]. Systematic reviews concluded that,the previous Stroke or transient ischemic attack, increasing age, hypertension, heart failure, diabetes mellitus, female sex and vascular disease are the major risk factors in the patients with AF associated Stroke[8,9]. Antiplatelets and anticoagulants are usually prescribed for the prevention of Stroke. Warfarin has a high risk of bleeding than aspirin, but is more effective at preventing Strokes[10,11].

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Risk stratification is crucial step in determining Stroke risk in patients which further can justify the bleeding risk associated with the use of oral anticoagulant. Since last several decades, many risk stratification schemes to predict Stroke in patients with AF have been proposed[9]. In search of user-friendly risk stratification scheme, Gage BF, *et al* (2001) have created the CHADS2 index by integrating risk factors independently predicting the Stroke risk. The name CHADS2 index indicates both, the factors, and scores upon which it is based.Each factor counting as 1 point except prior stroke, which as the strongest risk factors gets 2 points[12].

According to the 2006 American College of Cardiology/American Heart Association/ Heart Rhythm Society guidelines for the management of Atrial Fibrillation, the CHADS2 scheme has emerged as a gold standard for predicting risk for stroke[13].

Though CHADS2 score has been used commonly, several concerns have remained. Recent studies have failed to show that the CHADS2 score has good predictive value. Additionally, several known risk factors (Old age, Female gender and Vascular disease) for Stroke in AF, are not accounted in the CHADS2 score. For the CHADS2 score 1, the risk of bleeding and the risk of Stroke are comparable.

The CHA2DS2-VASc score has been proposed, as there was an increasing need to include common Stroke risk factors.The CHA2DS2-VASc score ranges from 0 to 9 and considers the weightage of age ≥75 years as a single risk factor for stroke. CHA2DS2-VASc also includes other risk factors like, vascular disease with myocardial infarction, aortic plaque and peripheral vascular disease and the female gender[14].

Here, in this study we aimed to report the additional proportion of Non-valvular Atrial Fibrillation patients, who required oral anticoagulation when the CHA2DS2-VASc score was used instead of $CHADS_2$ score and the number of bleeding episodes and compliance to oral anticoagulation in Indian population.

Materials and Methods

This study was conducted at the Outpatient/ In-patient Department of a Tertiary Care Centre in Western Maharashtra. Patients were screened based on the predefined inclusion/ exclusion criteria. Adults (either gender) with Non-valvular Atrial Fibrillation (NVAF) based on Electrocardiography (ECG) and Echocardiography (2DECHO) findings and willing to participate in the study were included. Patients with severe mitral stenosis and prosthetic valve implantation were excluded.

The study was approved by an Institutional Ethics Committee and included patients signed an informed written consent.

General and clinical history was recorded in a pretested proforma. Physical and Clinical examinations were performed by a clinician. Data regarding initial diagnosis of NVAF, types of symptoms, presence of comorbidities including Stroke, Diabetes Mellitus, Coronary Artery Disease, Peripheral Vascular Disease, Congestive Heart Failure, Hypertension and Bleeding events were collected.

Standardized protocols were followed to perform radiological investigations (ECG and ECHO) and results were recorded.

Vascular disease defined as Coronary Artery Disease or Peripheral Vascular Disease. The CHADS2 score and CHA2DS2-VASc score of all the patients were calculated.

The CHADS2 index takes its acronym from both the factors and scores upon which it is based (Table A) with each factor counting as 1 point except prior Stroke, which as the strongest risk factors gets 2 points[12].

Table A — *$CHADS_2$ Risk Factors*

$CHADS_2$ Risk factors	Score
Congestive heart failure	1
Hypertension (BP>140/90 mmHg or treated hypertension)	1
Age ≥75 years	1
Diabetes mellitus	1
Stroke / Trasientischaemic attack	2
Maximum Score	6

Table B — *CHA_2DS_2-VASc Score*

CHA_2 DS_2-VASc score	Score
Congestive heart failure	1
Hypertension	1
Age ≥75 years	2
Diabetes mellitus	1
Stroke / transient ischaemic attack	2
Vascular disease	1
Age 65-74 years	1
Sex category (female sex)	1
Maximum score	9

The CHA2DS2-VASc score has been calculated (Table B), with scores ranging from 0 to 9[14].

After enrollment a six month telephonic follow-up was done to see the compliance and bleeding events.

Statistical Analysis :

Data analysis was conducted using MS Excel (Microsoft 365) and IBM SPSS Statistics 27. Data was presented using descriptive statistic. Since most of the data was categorical, data is represented as frequency and percentages. Age is represented as Mean & Standard Deviation. Chi-square test of independency of attributes was applied for checking association between scoring systems and different scores. For all the tests p-value of <0.05 (two tailed) was considered as statistically significant.

Results

A total of 87 patients (43 females) of Non-valvular Atrial Fibrillation (NVAF) based on Electrocardiography (ECG) and Echocardiography (ECHO) were studied. Patients had an average age of 71.7 (±8.5) years with the range of 46-93 years. Maximum (n=39, 45%) patients were >74 years of age. Symptoms described by the patients included, Palpitation (41%), Shortness of breath (34%), Chest pain (2%) and syncope (1%). Good number (n=34, 39%) patient were asymptomatic, out of which some tolerated AF well, but majority were on treatment. The duration of Atrial Fibrillation was ≤1 week in one third and >1 week in two third numbers of patients (Table 1).

Table 1 — *Characteristics of the Population (at presentation) (n=87)*

Characteristics		Frequency
Age (years); mean ±SD		71.7 ± 8.5
Gender : Female (n%)		43 (49.4%)
Age groups :	< 65 years	17 (19.5%)
	65 - 74 years	31 (35.6%)
	≥74 years	39 (44.8%)
Presence of Symptoms of AF (n,%)	Palpitation	36 (41.4%)
	Shortness of breath	30 (34.5%)
	Chest pain	2 (2.3%)
	Syncope	1 (1.1%)
	Stroke/TIA	16 (18.4%)
Asymptomatic		34 (39.1%)
Duration of AF (weeks)	<1 week	29 (33.3%)
	>1 week	37 (42.5%)
	More than 12 months	21 (24.1%)
Treatment	Aspirin	42 (48.3%)
	Oral anticoagulants	27 (31%)
Comorbidities present (n%)	Thyroid disease	11 (12.6%)
	IHD	27 (31%)
Additions present (n%)	Smoking	18 (20.7%)
	Alcoholism	13 (14.9%)
ECG findings	AF	84 (96.6%)
	Sinus rhythm	3 (3.4%)
ECHO findings	Ejection fraction <40%	20 (23%)
	Ejection fraction >40%	67 (77%)

Values displayed are frequency (%), Age is summarised in mean ± SD.

At the time of presentation, 42 patients were on Aspirin and 27 were on oral anticoagulation. Some patients came to us directly but majority were referred to Cardiology Department by treating Physician for opinion regarding management of AF. Comorbidities were present in 38 patients (11 with Thyroid disease and 27 with Ischemic Heart Disease). Among patients with Thyroid disease, only one patient had Hyperthyroidism. History of substance abused revealed, 18 (21%) were smokers and 13 (15%) used to consume Alcohol (Table 1).

As per the ECG findings, at time of presentation 84 patients were in AF and 3 were in sinus rhythm. On Echocardiography 20 patients were having ejection <40% and 67 patients were having ejection fraction >40% (Table 1).

Frequency of variables of CHADS2 scoring system and CHA2DS2-Vasc scoring systems are shown in Table 2.

CHADS2 Score of the Patients :

Using CHADS2 scoring 8 patients had 0 score, 23 had 1 score and 56 patients were having score ≥2. Considering CHADS2 score 56 patients were needed oral anticoagulation (Table 3).

Table 2 — *Frequency of variables of CHADS2 scoring system and CHA2DS2-Vasc scoring systems*

Risk factors	Number of patients	Percentage (%)
CHADS2 Score :		
CCF	20	23
Hypertension	58	66.7
Age ≥75	39	44.8
Diabetes Mellitus	33	37.9
Stroke or TIA	16	18.4
CHA2DS2-Vasc Score :		
CCF	20	23
Hypertension	58	66.7
Age 65 - 74	31	36.8
Age ≥75	39	44.8
Diabetes Mellitus	33	37.9
Stroke or TIA	16	18.4
Vascular disease	30	34.5
Gender Female	44	50.6

Data presented as n(%)

CHA2DS2-Vasc Score of the Patients :

Using CHA2DS2-vasc scoring 1 patient had 0 score and remaining 86 had score ≥1.

At time of presentation, 27 patients were already on oral anticoagulants. Either Vitamin K antagonist or newer oral anticoagulants were started in 60 patients, depending on their CHA2DS2-Vasc score. At the time of 3 months follow up, 21 (26%) patients discontinued oral anticoagulation at 6 months follow up 27 (33%) patients discontinued oral anticoagulation (Table 3).

Among patients taking oral anticoagulation previously, 5 had history of bleeding. During follow up 2 patients had bleeding episode at the end of 3 months and 5 had bleeding episodes at end of 6 months. All were minor bleeding like gum bleeding and epistaxis, needing only local treatment without stopping oral anticoagulation (Table 4).

In the studied population, 80 patients needed oral anticoagulation depending on their CHA2DS2- Vasc score. Of the remaining 7 patients, 6 were female <65 years of age with lone AF and 1 patient had CHA2DS2- Vasc score of zero. Only 22 (27%) patients needing anticoagulation opted for newer oral anticoagulants over Vitamin K antagonists (Table 4). The main hurdle to start newer oral anticoagulants was the economic constraints of the patients. Among the newer anticoagulants, Apixaban was most preferred and started in 18 patients followed by Rivoroxaban in 3 patients and Dabigatran in one patient.

Table 3 — *Association between scores and different scoring systems*

Score	CHADS2	CHA2DS2	P-Value
0	8 (9.2%)	1 (1.1%)	< 0.001*
1	23 (26.4%)	7 (8%)	
≥2	56 (64.4%)	79 (90.8%)	

Variables are expressed as Frequency (%), Chi-square test. P<0.05; *Statistically Significant.

Table 4 — *characteristics at presentation and follow-up*

	Prescription and Compliance to Oral Anticoagulants (n)			Bleeding Episodes (n)	
	On OAC (VKA/NOAC)	Not On OAC (VKA/NOAC)	Not Needed OAC	Yes	No
At presentation	27	60	0	5	82
At 3 months	59	21	7	2	78
At 6 months	53	27	7	5	75

Data presented as numbers
OAC : Oral Anti Coagulants, VKA : Vitamin K Antagonist, NOAC : Newer Oral Anti Coagulants

Effect of CHA2DS2-Vasc Score on CHADS2 Score of the Patients :

The increment in the risk score when CHA2DS2 Vasc scoring applied to same patient population compared to their CHADS2 score is shown in Table 2[6]. Out of 87 patients, 8 patients were having CHADS2 score of 0, 23 patients were having score of 1 and 56 were having a score ≥2.

When CHA2DS2- Vasc scoring was applied to 8 patients with CHADS2 score of zero, only one stood with score of zero, 5 patient's score increased to 1, and 2 patients score increased to ≥2. Similarly with CHA2DS2- Vasc scoring out 23 patients with CHADS2 score of 1, only 2 patients were stood with a score of 1 and 21 patients score increased to ≥2. This increment in risk score kept very few patients in low and intermediate risk group.

The Bland Altman plot to find out difference between the scores of CHADS2 score and CHA2DS2-Vasc score, depicted positive agreement between the methods (Fig 1).

The below chart (Fig 1) for difference between the scores of CHADS2 score and CHA2DS2-Vasc score almost all the data points fall within the range of 95% confidence interval.

Discussion

In the context of Stroke risk in Atrial Fibrillation (AF), the CHADS2 scheme, widely adopted since the 2006 guidelines, has been a standard tool. However, recognizing the need to account for additional stroke

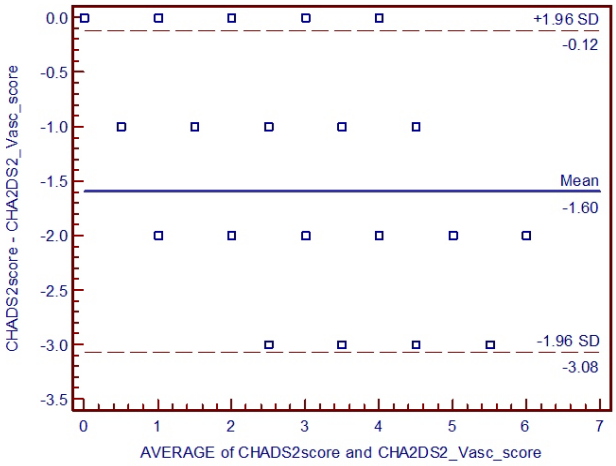

Fig 1 — Bland Altman plot to compare the CHADS2 score and CHA2DS2 score

risk factors, the CHA2DS2-VASc score was introduced. Our study focuses on its impact on anticoagulation recommendations for Indian AF patients. We enrolled 87 Non-valvular AF patients in a short-duration prospective observational study.

The mean age of the patients was 71 years, with the majority falling in the 71-80 age group. Fifty percent of the patients were female and 34% had Vascular Disease, Mainly Coronary Artery Disease. We observed a significant shift in risk categorization when factors like Age, Gender, Vascular Disease and Age $\geq$75 were considered. Symptomatically, patients presented with Palpitations (41%), Shortness of breath (34%), Chest pain (2%) and Syncope (1%). Notably, 39% were asymptomatic or symptom-free due to ongoing treatment. The duration since AF diagnosis varied, with most patients on rate control medication (96%).

In a similar vein, the PINNACLE registry reported a 45% rate of anticoagulation initiation among AF patients[17]. Eleven patients had Thyroid disease, primarily Hypothyroidism, deviating from the expected prevalence of Hyperthyroidism. At the time of presentation, 84 patients were in AF, while 3 were in sinus rhythm. Comorbidities included Congestive Cardiac Failure (23%), Hypertension (66%), Diabetes Mellitus (37%) and Stroke/Transient Ischemic Attacks (18%). Comparing CHADS2 and CHA2DS2-VASc scores showed that the latter increased risk scores for many patients, with 92% needing anticoagulation, compared to 64% using CHADS2. This shift was in line with previous studies[18]. Following anticoagulation initiation, telephonic follow-ups revealed discontinuation rates of 26% at 3 months and 33% at 6 months. This mirrored findings in the ATRIA study, where 50% of patients discontinued warfarin over 3 to 5 years due to various reasons. Among those on oral anticoagulation, 73% opted for Vitamin K antagonists, while 27% chose Newer Oral Anticoagulants (NOACs). A small percentage of patients experienced minor bleeding episodes during follow-up, with none necessitating anticoagulation cessation. In summary, our study highlights the significant impact of CHA2DS2-VASc scoring on anticoagulation recommendations for Indian AF patients, underscoring the need for more comprehensive risk assessment in Stroke prevention strategies.

Limitations :

Our study is a single centered study, though the sample size included is statistically significant, the number of AF patients included was small. Additionally, an emergence of new techniques (machine learning and artificial intelligence) for digital ECG analysis and new technologies (wearables) have provided significant opportunities for the detection and diagnosis of AF. These innovations may help to personalize therapy and risk stratification.

There is a gap in knowledge regarding optimal NOAC dosing in specific groups, including those with mild-to-moderate CKD, with very low/high Body Mass Index, and patients receiving medications with a high risk of metabolic interaction

Conclusions

Structured, clinical and risk-score"based assessment of individual thrombo-embolic risk, using the CHA_2DS_2-VASc score, should be performed as the first step in optimal thrombo-embolic risk management in AF patients

Close follow up is needed to improve compliance and to look for any bleeding or ischemic events. To improve compliance and decrease complication safer agents like newer oral anticoagulants should be used.

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Case Report

An Imported Case of Multi-variant Complicated Severe Malaria — A Rare Case Report

Hemanth Kumar Gandru[1], Kirubhakaran Kanakaraju[2]

Abstract

Background : Malaria is caused by the Parasite Plasmodium and is transmitted by mosquitoes called Anopheles. A case of malaria has been reported in a 37 year old male patient who has been in a Malaria-endemic country and returned to India. India is a country where Indian nationals often travel to foreign countries for business and other purposes. An elderly male, 34, reported a fever for 15 days, vomiting four episodes, headache for 14 days and intermittent loss of consciousness for two episodes. When the patient came to casualty and hospital course, the patient developed other manifestations of Severe Malaria. Our case report describes a case of Multi-variate Severe Malaria successfully treated with intravenous antimalarial drugs and oral primaquine in our hospital.

Key words : Severe Multi-variant Malaria, Hypoglycaemia, Acute Respiratory Distress Syndrome, Severe Multi Complicated Malaria, Plasmodium Vivax, Plasmodium Falciparum

Malaria is a highly prevalent parasitic infection, and a serious public health issue. It is known to Prevalent in 84 countries Worldwide and 247 million cases in the world and there are 4,09,000 deaths due to Malaria each year as per data till 2021 By WHO[1]. The genus plasmodium has six important species named P falciparum, P vivax, P ovale, P malariae, P simium, P cynomolgi. The human is an intermediate host and the anopheles mosquito is the definitive host for Plasmodium falciparum. Plasmodium falciparum is an essential determinant of the patient's admission to the Intensive Care Unit. As published earlier, Plasmodium falciparum causes increased immortality in patients and Plasmodium vivax causes morbidity, so aggressive treatment is essential[10]. In this case report, the patient is affected with Multi-variant Malaria caused by Plasmodium falciparum and Plasmodium vivax which has been treated successfully in our hospital.

Case Report

An elderly male of 34 years reported a fever for 15 days, vomiting four episodes, headache for 14 days and intermittent loss of consciousness of two episodes. The patient does not have any other health problems. Patient has a travel history to South Africa for eight months and returned to India 20 days before and then the patient started developing symptoms. Personal history Patient is having long-term alcoholism and smoking. The patient was having icterus but there were no signs of edema, clubbing, cyanosis, pallor and lymphadenopathy on general examination. The spleen is palpated in the left midclavicular line between the left subcostal margin and umbilicus corresponding to grade-2 of hackett's grading system. The patient was drowsy but acutely aware of the time, place and person. The differential diagnosis at this point is alcoholic Hepatitis and all required investigations have been sent. Then suddenly the patient had chills and rigor, breathlessness and bilious large volume vomiting and patient became unconscious. In the view of aspiration and impending respiratory failure, the patient was intubated and kept on mechanical ventilation. The patient's urine gradually became black in color as shown in the picture (Fig 1). On investigations, the peripheral smear was positive for Plasmodium vivax (Fig 2). Patient indirect bilirubin was increased to 9.7 and other investigations as follows Hb 5.7, WBC count 17000, Platelets 26000, Urea 26, creatinine 0.8, Direct bilirubin 5.2 SGOT 91, SGPT 70, Random Blood Sugar 58, HIV- non-reactive and HbsAg-negative. Malaria RDT also came positive for Plasmodium vivax malaria. By confirming it as P vivax Malaria, we have started the patient with injection artisunate 2.4 mg/kg stat and tablet primaquine 0.25 mg/kg and tablet pyrimethamine 1.25 mg/kg and sulphadoxine 25 mg/kg. On day 3 of hospital admission Patient's X-ray

Editor's Comment :

- Early detection and aggressive management, particularly in imported cases, are crucial when it comes to severe multi-variant malaria.
- This patient's successful treatment for cerebral malaria, ARDS and hemolytic complications emphasizes the importance of vigilant monitoring and supportive intensive care when treating cerebral malaria and ARDS, respectively.

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Fig 1 — Complicated Severe Malaria Patient

AP view discloses the bilateral infiltrates in the Lungs. In the probability of Acute Respiratory Distress Syndrome[6], secondary to sepsis due to Plasmodium falciparum infection, we have repeated the peripheral smear and it came positive for Plasmodium falciparum as shown in picture (Fig 2). The patient started on 3rd generation cephalosporins in the view of ARDS. In this stage, the patient is on mechanical ventilation, not responding to painful stimulation and has multiple fever spikes and impaired consciousness (coma) as shown in the picture (Fig 1). On day 5 of hospital admission the patient's urine started to change in color and the icterus was reduced. Patient was continued with artemisinin combination therapy. On consecutive days the patient's condition became better and the patient's urine started changing in color to normal, infiltrates are reduced in Chest X-ray. The patient was partially conscious and able to respond to oral commands followed by the mode of ventilation changed to spontaneous mode. On day 7 of hospital admission the patient's Oxygen requirement was reduced and the patient kept on on T-piece for 4 hours and then extubated. On day 10 Patient was conscious oriented and able to do minimal movements. On day 14 the patient was discharged and sent home.

Discussion

Most of the Imported Malaria is caused by Plasmodium falciparum (P falciparum), and there have been few reports of mixed infections with P falciparum or P vivax. This report describes a case of mixed malarial infection involving P falciparum and P vivax. The people traveling to endemic areas and having fever episodes should be evaluated as earliest possible though the elimination programs , control measures, prophylactic measures are followed[3]. These methods are strictly followed in India still patients are affected with Malaria. In previous studies it is found that

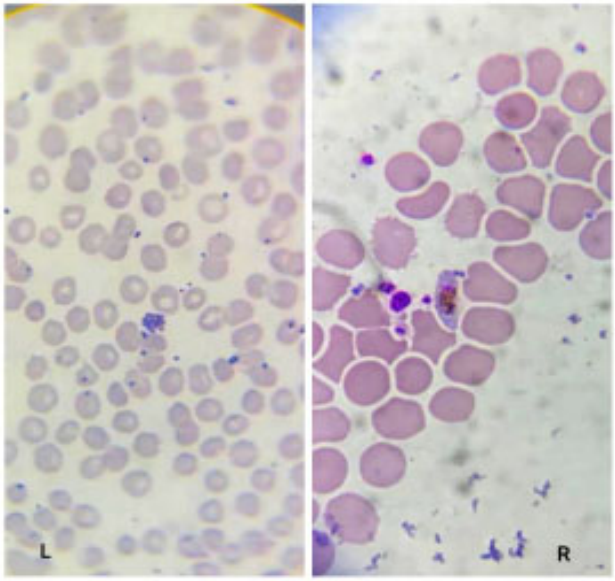

Fig 2 — Image Showing Slide with P vivax and P falciparum

most of the mixed infections caused by P vivax and P falciparum do not occur as a result of simultaneous inoculation with both parasites[5]. When this female anopheles mosquito bites and inoculates sparrows into human skin. These motile parasites will travel to the blood and then the liver. The asexual phase of the life cycle will take place in hepatocytes and release more than 30,000 merozoites through amplification[8]. These merozoites will enter blood circulation again and invade Red Blood Cells and make them infected. After entering into red blood cells these joints will be converted to trophozoites and multiply every 48 hours. These infected Red Blood Cells will burst and release trophozoites and these released trophozoites will again enter other non-infected Red Blood Cells and make them infected. When a mosquito bites the human in this stage, these trophozoites will enter into the mosquito for sexual phase of life cycle and convert into male and female gametocytes. By fusing this gametocytes against sporozoites will be formed and move to salivary glands. When this mosquito bites a human being these sporozoites will enter into the human being and the cycle continues[8]. Patients will be symptomatic and trophozoites are being multiplied in the RBC. The typical fever of Malaria, which is evening rising temperatures are because of when these RBC lies cytokines, inflammatory barker will be released so that patient will have evening rise of temperatures typically, malaria is having fever paroxysms namely, which are cold stage, hot stage and wet stage in uncomplicated malaria. Complex Malaria accompanied by Cerebral Malaria, Severe Hemolytic Anemia, Jaundice, Acute Kidney Injury, Acute Respiratory Distress Syndrome, Hypoglycaemia, Convulsions, Loss of Consciousness, Pulmonary Edema and Metabolic Acidosis. In our subject we have observed Severe Hemolytic Anemia, Jaundice, Acute Respiratory Distress Syndrome, Hypoglycemia,

Convulsions and Cerebral Malaria. It has been reported that adults with severe P falciparum malaria are susceptible to ARDS in 5 to 25% of instances, with mortality rates ranging from 20% to 95%[6]. It has been reported that parasitized Red Blood Cells sequester themselves in cerebral microcirculation, but others attribute consciousness impairment to metabolic factors and inflammation with coma appearing suddenly and with seizures soon after fever onset[7]. Both health care settings and the community can suffer from severe anemia when suffering from vivax malaria. Plasmodium vivax has stronger propensity to RBC than Plasmodium falciparum hence bursting mechanisms for releasing merozoites from RBC is more for P vivax. Reticulocytes that are infected with P vivax die prematurely, so results in extreme anemia over several months by cutting off the supply of mature Red Blood Cells[11]. It is likely that vivax malaria's hematological effects are complicated by Gastrointestinal helminth infection, Haemoglobin and Red Blood Cell abnormalities[11]. Observations have shown that malarial Hepatitis is one of the common causes of jaundice associated with P vivax malaria, following intravascular hemolysis, disseminated coagulation. Hepatic dysfunction and predominantly unconjugated Jaundice in our patient suggest that both hemolysis and hepatic dysfunction are contributing to the patient's Jaundice. A disruption in glucose supply and markers of disease severity were associated with hypoglycemia occurrence[13]. Hyperparasitemia was not observed with our patient and it gave strong support to studies described several patients admitted to the ICU had not been diagnosed with hyperparasitaemia and were originally from malaria-endemic regions[9]. According to previously published data it is thought to be inoculated by multiple bites and P vivax relapse may be triggered by symptomatic falciparum malaria infection, which seems more plausible[3]. People may be infected with multi-variate malaria but published studies show that the vivax malaria will come positive initially and falciparum will be detected next. A combination therapy of artemisinins is recommended by WHO as the preferred treatment against falciparum malaria and vivax malaria[1]. As of the moment, in India, there are five combination therapies registered to treat falciparum malaria: Artemether-Lumefantrine (AL), Artesunate-amodiaquine, Artesunate-mefloquine, Dihydroartemisinin-piperaquine, Artesunate + Sulfadoxine-pyrimethamine (AS + SP) and Arterolane Maleate + Piperaquine Phosphate[2]. As shown in Table 1 and Table 2, treatment options are available for corresponding variants and severity of malaria[8]. Mixed infections of P falciparum and P vivax should be treated with artemether and lumefantrine, combined with a radical treatment of primaquine (0.25 mg/kg for 14 days)[4]. As a contrast, artemether-lumefantrine and primaquine (0.25 mg/kg) should be used for P falciparum. However, chloroquine and a radical cure with primaquine can be used for P falciparum because they are less toxic[2]. In this case we treated this patient with

Table 1 — *Treatment options for uncomplicated Malaria in India*

Drugs with dose	Comments
P vivax malaria :	
Chloroquine 25 mg/kg over 3 days	Chloroquine 10 mg/kg on day1
or	10 mg/kg on day 2
Primaquine 0.25mg/kg/day for 14 days	5 mg/kg on day 3
P falciparum malaria :	
Artemisinin Combination Therapy (ACT) and Primaquine 0.75mg/kg on day 2 single dose	All of India except North eastern states (ACT-AS+SP) Artesunate 4 mg/kg qid for 3 days and sulfadoxine 25 mg/kg+ pyrimethamine 1.25mg/kg on day 1 North eastern states of india ACT-AL Artemether/lumefantrine 1.5/9 mg/kg twice a day for 3 days along with food
Mixed infections with P vivax and P falciparum : Artemisinin Combination Therapy (ACT) and Primaquine 0.25 mg/kg/day for 14 days	

Table 2 — *Treatment options of severe complicated Malaria in India*

Treatment options	Other comments
Initial parenteral treatment for at least 24 hours with one of the following drugs	Follow-up treatment when patient can take oral medication
Artesunate 2.4 mg/kg IV given on admission then at 12 hours then 24 hours then once a day continued till 5th day	Full oral course of area specific ACT
Or	All of India except North eastern states
Artemether 3.2 mg/kg IM given on admission then 1.6mg/kg twice/day for 3 days	(ACT-AS+SP) for 5 days + primaquine 0.25 mg/kg for 14 days
Or	North eastern states of india
Arteether 150 mg daily IM for 3 days in adults only	ACT-AL for 3 days + primaquine 0.25 mg/kg on 2nd day
Or	
Artemisinin 10 mg/kg at 0 and 4 hours followed by 24,36,48 and 60 hours	
Quinine 10 mg/kg 8 hourly in 5% dextrose saline is preferred	Patients should be switched to oral quinine 10 mg/kg 8th hourly for minimum 7 days And Doxycycline 3mg/kg once a day for 7 days Or Oral quinine 10 mg/kg 8th hourly for minimum 7 days And Clindamycin 10 mg/kg twice a day (for pregnant women and children under age of 8 years for 7 days)

ACT-AL- Artemisinin Combination Therapy (ACT) - Artemether/lumefantrine
ACT-AS+SP-Artemisinin Combination Therapy (ACT) - Artesunate + Sulfadoxine + Pyrimethamine

Injection Artesunate 2.4 mg per kg STAT followed by 2.4 mg /kg at 12 hours and 24 hours followed by 5 days of Artemisinin Combination Therapy that includes Artesunate + Sulfadoxine-Pyrimethamine (AS + SP) along with 0.25 mg/kg of TAB Primaquine for 2 weeks and 3rd generation cephalosporin in the view of co-infection with bacteremia.

Conclusion

A severe complex Multi-variant Malaria may be encountered in imported cases only 2% of the time and only 2% of patients have been evaluated for both variants and treated accordingly, Plasmodium falciparum is associated with high mortality rates and Plasmodium vivax is associated with severe illness (morbidity), indicating the importance of evaluating patients early and providing them with an effective anti-malarial treatment,which gives immense results in the treatment of patients in developing countries like India.

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Case Report

A Case of Arrhythmogenic Right Ventricular Cardiomyopathy with Left Ventricular Involvement Presenting as Recurrent Ventricular Tachycardia

Sridevi Chigullapalli[1], Vijay Sharma[2]

Abstract

Background : Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) is condition of genetic inheritance. Pathologically characterized by fibrofatty replacement of cardiac muscle mainly in right ventricular myocardium. Ventricular arrhythmias of right ventricular origin may lead to sudden cardiac death in young adults and athletes. Usually, male patients with age less than 40 years present with recurrent palpitation later develop progressive right heart or biventricular failure. Here we report a case of Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) with left ventricular involvement with recurrent ventricular tachycardia.

Case Presentation : A 39-year-old male patient with no comorbidities presented with palpitations and giddiness. He was hemodynamically unstable and ECG showed ventricular tachycardia with Left Bundle Branch Black (LBBB) morphology. Patient was managed with cardioversion and anti arrhythmic drugs amiodarone and betablockers. His 2D echo and cardiac MRI done and diagnosis of arrhythmogenic right ventricular cardiomyopathy with left ventricular involvement was made based on 2020 international criteria. He was adviced Implantable Cardioverter-Defibrillator (ICD) implantation. As patient refused ICD implantation he was continued on amiodarone and beta blockers.

Conclusions : ARVC is a rare disorder, and proper diagnosis is important to avoid unnecessary delay in managing the patients. 2020 International criteria helps to diagnose ARVC. Although ICD implantation is the treatment of choice for these patients, medical management with beta-blockers and amiodarone are helpful to prevent recurrent episodes of ventricular tachycardia in these patients.

Key words : Arrhythmogenic Right Ventricular Cardiomyopathy, Recurrent Ventricular Tachycardia, LV Involvement.

Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) is a rare inherited disorder with autosomal dominant inheritance. Pathologically characterized by fibrofatty replacement of cardiac muscle mainly in right ventricular myocardium[1]. As per literature review, prevalence of ARVC is 2 to 5 persons per 10,000 persons and most of them were asymptomatic and diagnosed before the age of 40 years. Severe manifestation of ARVC leads to sudden death especially in young Athletes[2].

Clinically ARVC present with recurrent ventricular tachycardia or supraventricular arrhythmias with morphological manifestation in Left Bundle Branch Block (LBBB), with typical findings of right pericardial ECG changes[2,3]. However, because of nonspecific nature and broad spectrum of variation of disease, diagnosis of ARVC is often difficult. Hence several investigations like 2D echo, Cardiovascular MRI and 2020 International guidelines may help to correctly diagnose this disorder[4].

Herewith we report a case of ARVC with left ventricular involvement presenting as recurrent ventricular tachycardia.

Case Report

A 39-year-old male patient with no comorbidities was admitted in CCU with palpitations and giddiness. His ECG showed ventricular tachycardia with LBBB morphology (Fig 2). His BP was low, and rhythm got converted to sinus rhythm after synchronized cardioversion with 200 J. He was given bolus amiodarone injection. He had similar complaints in the past for which he was admitted in another hospital and received cardioversion and started on amiodarone. His amiodarone was continued.

On physical examination no significant positive findings. On cardiovascular examination his heart sounds were normal and no murmurs and additional sounds were detected. After cardioversion his resting ECG showed T inversion in V1 to V4 (Fig 1). On further work up his blood investigations were normal. 2D echocardiography showed dialted RA, Right Ventricle (RV). RV was dilated with RV apex aneurysm and hypokinesia of RV free wall with RV dysfunction TAPSE 11 mm. There was low pressure moderate TR. Left Ventricle (LV) appeared normal on 2D echocardiography.

His MRI was done which showed dilated RV with thinning of walls and fibrofatty infiltration seen more severe near

Editor's Comment :

- ARVC is a rare cardiac life threatening disorder presents with ventricular tachycardia.
- 2020 International criteria helps to diagnose ARVC.
- Cardiac MRI is helpful in diagnosing involvement of left ventricle.
- ICD implantation is the treatment choice for these patients.
- Medical management with beta-blockers and amiodarone are helpful to prevent recurrent episodes of ventricular tachycardia.

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Fig 1 — Resting ECG showing T inversion in V1, V2, V3.

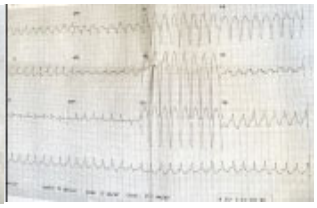

Fig 2 — ECG during Ventricular tachycardia showing LBBB morphology.

apical region. Right ventricular ejection was 38%. MRI also revealed patchy involvement of left ventricle with mildly reduced ejection fraction to 40%.

The definitive diagnosis of ARVC was made as per 2020 International criteria. He was advised ICD implantation as he meets the criteria of class 1 indication for ICD implanatation. He was not willing for ICD implanation. During hospital stay he had 2 recurrent episodes of venricular tachycardia which required DC cardioversion.

As he was not willing for ICD impalntation we continued his amiodarone and started betablockers with metoprolol and ramipril in view of left ventricle involvement. His genetic testing was adviced, but he was not willing for the testing and could not be done.

There were no further recurrences of tachycardia and he was discharged with amiodarone and betablockers and ramipril.

Discussion

Arrhythmogenic Right Ventricular Cardiomypathy (ARVC) also called arrhythmogenic right ventricular dysplasia is an inherited heart disease with autosomal dominant inheritance with variable expression. ARVC was first described in 1977, is a poorly understood, yet lethal cardiac disease.

ARVC is characterised by fibrofatty replacement of the right ventricular myocardium. It is more commonly seen in males. It can be isolated or familial with autosomal dominant pattern of inheritance. Genetic variations have been found in desmosomes responsible for cell to cell binding[5]. The clinical onset is delayed to adolescence or early adulthood. Clinical manifestations vary with age and stage of disease[6]. In early stage of the disease changes are subtle or absent and confined to localised region of the right ventricle typically of the inflow tract, outflow tract and apex of the RV, the triangle of dyplasia[1,4]. LV involvement in ARVC has been described with a prevalence of 16% to 76% with increase in use of cadiac MRI. It can affect inter ventricular septum but more often involves LV free wall with a predilection for posteriolateral area[4].

The diagnosis was based on 2020 International criteria[7], our patient met two major and one minor criteria hence definitive diagnosis of ARVC done.

Our patient had T wave inversion in V1-V4 on baseline ECG and during ventricular tachycardia LBBB morphology suggesting origin of VT from right ventricular out flow tract. His 2D echocardiography revealed dilated right ventricle with hypokinesia of right free wall and apex. His MRI showed involvement of right ventricle along with left ventricle. Based on MRI findings we categorized patient into fourth stage of disease.

Specific management options like life style changes, pharmacological treatment, catheter ablation, ICD placement or heart transplantation are recommended for the patients with ARVC.

In this patient ICD placement was a class I recommendation, but could not be done as patient was not ready for the procedure. ICD placement is recommended in ARVC patients who are at high risk of sudden death, experienced one or more episodes of hemodynamically unstable sustained VT or VF (Class I) or severe systolic dysfunction of RV,LV or both irrespective of arrhythmias (Class I).

We treated our patient with beta-blockers and amiodarone and angiotensin converting enzyme inhibitors in view of left ventricle dysfunction on cardiac MRI. Patient was advised to avoid strenuous activities that can precipitate VT or VF.

Conclusions

ARVC is a rare disorder, and correctly diagnosing is important to avoid unnecessary delay in managing the patients. 2020 International criteria helps to diagnose ARVC. Cardiac MRI is helpful in diagnosing involvement of left ventricle. Although ICD implantation is the treatment choice for these patients, medical management with beta-blockers and amiodarone are helpful to prevent recurrent episodes of ventricular tachycardia.

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Letter to the Editor

[The Editor is not responsible for the views expressed by the correspondents]

Association of Strongyloides stercoralis with Gastric Adenocarcinoma — Is There a Role of Immune Response?

Sir, — Strongyloidiasis is a disease caused by an intestinal nematode called Strongyloides stercoralis. It spreads through soil and is generally found in tropical and subtropical areas. It is estimated that this disease affects around 30 to 100 million people globally[1]. The life cycle of S Stercoralis can occur through direct, indirect, and autoinfection. In the direct cycle, rhabditiform larvae in the soil grow into filariform larvae and infect new hosts by penetrating the skin. The larvae then travel to the lungs and the gastrointestinal system. In the indirect cycle, eggs hatch in the soil and develop into infective larvae, which can live in the soil or re-enter the host through the skin around the anus, leading to autoinfection[1]. It is surprising to note an association between this nematode and carcinoma.

Few case reports describe the coexistence of S Stercoralis infection with gastric adenocarcinoma[1,2]. In these reports, S. stercoralis was identified in the gastric and duodenal mucosa of patients diagnosed with gastric adenocarcinoma. The co-occurrence of Strongyloides stercoralis and gastric adenocarcinoma or other carcinomas are explained by the immunocompromised state of an individual. However, the causal relationship of S Stercolaris and carcinoma is not established and the mechanisms by which S Stercoralis could potentially contribute to gastric adenocarcinoma development are poorly understood.

The literature also suggests considering S Stercoralis infection in the differential diagnosis of gastric masses, especially in endemic regions[3,4]. Numerous reports describe the coexistence of S Stercoralis infection with gastric and intestinal adenocarcinomas[1,5,6]. S Stercoralis can cause systemic and gastrointestinal disease, particularly in immunocompromised patients, and can be associated with gastrointestinal symptoms that might mimic or coincide with those of malignancies[1,2].

The inflammatory response triggered by S Stercoralis, including eosinophilia and eosinophil activation, is associated with intestinal inflammation[7]. This also gives insight into the risk of developing severe strongyloidiasis syndrome in immunocompromised individuals[7]. Chronic inflammation is a recognised risk factor for various cancers, including gastric adenocarcinoma, due to the potential for inflammatory cells and cytokines to induce DNA damage, promote angiogenesis, and support a microenvironment conducive to tumour growth[8-10]. However, the specific immune responses to S Stercoralis and how they might intersect with the inflammatory pathways implicated in gastric adenocarcinoma pathogenesis are not fully understood. Also, the specific link between Strongyloides stercoralis-induced inflammation and gastric adenocarcinoma needs validation.

To conclude, clinicians should consider the possibility of strongyloidiasis in immunocompromised patients presenting with gastrointestinal symptoms, even when malignancy is suspected or confirmed. While chronic inflammation related to parasitic infections could contribute to carcinogenesis, the current medical literature does not provide evidence of a direct role of the immune response to S Stercoralis infection in the pathogenesis of gastric adenocarcinoma. Further research would be necessary to explore this potential link. Clinicians should consider the possibility of strongyloidiasis in immunocompromised patients presenting with gastrointestinal symptoms, even when malignancy is suspected or confirmed.

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