Vol. 10, No. 1
January 2025

BMDC Approved

ISSN 2520-7784

Tairunnessa Memorial Medical College Journal

Peer Reviewed Journal

TMMC Journal, January-June 2025; Volume 10, Number 1

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Official Journal of
Tairunnessa Memorial Medical College

Tairunnessa Memorial Medical College Journal

Vol. 10, No. 1, January 2025

Published by

Tiarunnessa Memorial Medical College

Editorial office

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Subscription rate

Single copy - Tk 100/- (US$ 10/-)

Yearly - Tk 200/- (US$ 20)

TMMC JOURNAL
Volume 10, Number 1, January 2025

Content **Page**

COMMON MOLECULAR MARKERS IN BREAST CANCER TREATMENT PLAN, PROGRESSION AND RECURRENCE

Magfura Pervin

American Cancer Society's biennial update of statistics on breast cancer revealed that incidence continued an upward trend, rising by 1% annually during 2012-2021. Which are largely confined to localized-stage and hormone receptor-positive disease. A steeper increase in Asian American/ Pacific Islander women younger than 50 years (2.7% annually) versus 50 years and older (2.5%).[1]

Molecular markers are a type of protein receptors, with the capability of attaching to hormones. Those being expressed by cancerous cells are used in determining the response to a specific therapy.[2] Molecular markers used in cancer detection are both proteins and modified sequence of DNA in cancerous tissue. These markers along with clinicopathological prognostic parameters give the best prediction of the prognosis of cancer and recurrence. These receptors help to access suitable therapeutic practice, which would stop the hormones and accessory factors that involved in cancer development.[3] Furthermore, specific drugs or other preventives such as, an antibody are used in a suitable targeted therapy to block the further growth and the metastatic spread of doppelgangers of neoplastic cells without destroying healthy cells in our body.[4]

Estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2(HER2) are well established biomarkers for breast cancer prognosis and for guiding treatment. These molecular markers can be detected by using immunohistochemistry (IHC) and fluorescence in situ hybridization (FISH), which are established, faster detection methods.

ERs and PRs are proteinaceous molecular markers found on mammary cells, which receive and gets stimulated by the circulated ovarian hormones, estrogen and progesterone. These steroid hormones activate ERs and PRs to proliferate, survive and insidiously spread the neoplastic cells as metastatic invasion to innards.[5] Consequently, breast cancer with ERs and PRs grows more slowly and steadily than other receptors such as HER2 with a better prognosis.[6]

ER-positive breast cancer patients have better survival rate than patients with ER-negative cancer.[7,8] Higher expression of ER in tumor predicts benefit from hormone therapy such as tamoxifen but ER negative tumor benefits more from chemotherapy since they are not stimulated by ovarian sex hormones.[9]

PR-positive breast cancer patients also have better survival rate than patients with PR-negative cancer.[4,7] Higher expression of PR in tumor or cells with increase in the PR receptor predicts response as same as estrogen.[10,11]

HER2 also known as “neu”. This “neu” is a proto oncogene that means a gene, promoting the specialization, differentiation and division of normal cells that could become an oncogene due to mutation. The historical name “neu” due to its discovery in rat neural tissue. That encodes a 185-kDa tyrosine kinase glycoprotein belonging to the EGFR (epidermal growth factor receptor) family as HER2.[9]

HER2 positive breast cancers are more aggressive and have a poor prognosis compared to HER2/neu negative tumors[11]. Overexpression of HER2 or tumors with too many copies of HER2 predicts benefit from targeted therapy like monoclonal antibody (trastuzumab) or by kinase inhibitor (lapatinib) in the metastatic as well as in the adjuvant setting along with chemotherapy. T-DM1 (trastuzumab emtansine)) used to treat HER2 positive breast cancer as an antibody-drug conjugate to allow targeted delivery of chemotherapy to HER2 positive cells. Whereas, HER2 negative tumors benefits from other targeted therapy such as everolimus.[5,7,8,11,12]

ER positive/HER2 negative with overall frequency 50%-65% among older women and also in men who are mainly in grade 1 and 2 timing of relapse is in low rate over many years. Although long survival is possible in these cases even with bony metastasis (70%-80%) but more than 10 yearsafter the diagnosis late recurrence is also possible unfortunately.

HER2 positive (but ER positive or negative) overall frequency is 20% and typical patients groups are younger women manily in grade 2 and 3 they exhibit bimodal timing of relapse with both early and late (10 years) peaks.

Triple negative (ER, PR, and HER2 all are negative): "TNBC" overall frequency is less that is 15% among younger women mainly in grade 3, reveal an early peak regarding timing of replase ＜8years. Although late recuuence is rare in these case, but survival with metastases is also rare.[13]

Lastly, we can conclude that estrogen receptors, progesterone receptors and the epidermal growth factor receptor-2 are the most routinely used basic, leading molecular markers for better treatment of breast cancer worldwide. These markers provide the suitable prediction of the prognosis of cancer recurrence after an initial remedial treatment, with an indication of eventual future appropriate therapy. For a better management of breast cancer, the diagnostic process should be fast, so that the oncologist could decide which therapeutic would be the better option for which of the patient on the basis of their receptor protein expression on the tumor cell.

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COMPARATIVE STUDY BETWEEN PRIMARY AND SECONDARY DENGUE BASED ON HEMATOLOGICAL MARKERS AND IGM/IGG SEROLOGICAL PROFILE

Siddika F[1], Chowdhury MA[2], Agarwala A[3], Alam F[4], Karim R[5]

ABSTRACT

Background: Dengue virus infection presents with varying clinical and hematological features in primary and secondary infections. Identifying these variations can guide prognosis and management. **Objective:** To compare hematological parameters between primary and secondary dengue infections, confirmed by IgM/IgG serology. **Methods:** A retrospective/ prospective study was conducted on dengue-confirmed patients. Patients were categorized into primary (IgM positive, IgG negative) and secondary (IgM positive, IgG positive) dengue groups. Complete blood count (CBC) parameters were analyzed and compared. **Results:** A total of 120 patients were included, divided into primary and secondary dengue groups. Secondary dengue cases showed significantly lower platelet counts , higher hematocrit levels , lower WBC counts, and elevated neutrophil-to-lymphocyte ratio compared to primary dengue ($p < 0.05$ for all). These hematological alterations suggest more severe disease in secondary infections. **Conclusion:** Secondary dengue infections exhibit significantly more severe hematological derangements than primary dengue, highlighting the prognostic value of CBC in conjunction with serology.

Keywords:

Date of submission: 15.12.2024

Date of acceptance after modification: 21.12.2024

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Citation: Comparative Study Between Primary and Secondary Dengue Based on Hematological Markers and IGM/IGG Serological Profile. TMMC Journal 2025;10(1):06-10.

Introduction

Dengue is a mosquito-borne viral disease endemic in tropical and subtropical regions. It is caused by four distinct serotypes of the dengue virus (DENV-1 to DENV-4).[1] Primary infection typically results in a self-limited febrile illness, whereas secondary infection, due to immune enhancement, is often associated with more severe disease such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).[2]

Hematological parameters, including leukopenia, thrombocytopenia, and elevated hematocrit, are hallmark laboratory features of dengue. However, their severity and trends may differ between primary and secondary infections. IgM and IgG antibody testing allows differentiation of these two infection types.[3]

This study aims to analyze and compare hematological profiles between primary and secondary dengue cases, using IgM/IgG serology for classification, to assess the utility of these markers in predicting disease severity and guiding management.

Materials and Methods

Study Design: Retrospective study

Study Duration: 1 year (June 2022 to July 2023)

Study Setting: Tairunnessa Memorial Medical College

Sample Size: 120 patients with serologically confirmed dengue

Inclusion Criteria:

-Patients of all ages with positive dengue IgM/IgG

- CBC done within first 3-5 days of illness

Exclusion Criteria:

- Co-infection with malaria, chikungunya, typhoid

- Pre-existing hematologic diseases

Classification:

- Primary dengue: IgM positive, IgG negative

- Secondary dengue: IgM positive, IgG positive or IgG strongly positive with weak IgM

Parameters Studied:

- Platelet count

- Total leukocyte count (TLC)

- Hematocrit (HCT)

- Hemoglobin (Hb)

- Differential count

- Neutrophil-Lymphocyte Ratio (NLR)

Statistical Analysis:

- SPSS software used

- Independent t-test

- p-value < 0.05 considered statistically significant

Results

Out of 120 confirmed dengue cases studied over one year, 90 cases (75%) were classified as primary dengue and 30 cases (25%) as secondary dengue.

The demographic and clinical features of both groups are summarized in Table 1. The mean age of patients was 17, with a slight male predominance. Fever, headache, and myalgia were commonly observed in both groups, although retro-orbital pain and rash were significantly more frequent in secondary dengue ($p < 0.05$).

Hematological parameters showed a significant drop in platelet count and WBC in secondary dengue compared to primary dengue. Additionally, hematocrit and atypical lymphocytes were notably higher in secondary cases. Hospital stay and complication rates were also greater in the secondary group.

Table 1: Clinical feautures of primary and secondary dengue cases

Symptoms	Primary case (n=90)	Secondary case (n=30)
Fever duration(days)	5	6.1
Headache and retro -orbital pain	72%	85%
Arthralgia	50%	80%
Cough , sore throat	40%	30%
Rash	20%	45%
Hypotension	30%	50%
Bleeding	5%	25%

Table 2: Laboratory parameters of primary and secondary dengue cases

Parameter	Primary Dengue (n=90)	Secondary Dengue (n=30)	p -value (if available)
Platelet count (×10⁹/L)	102 ± 45	65 ± 30	<0.01
Hematocrit (%)	40 ± 4	45 ± 6	<0.01
WBC count (×10⁹/L)	3.5 ± 1.2	2.8 ± 1.0	<0.05
Neutrophils (%)	55 ± 10	48 ± 12	<0.05
Lymphocytes (%)	35 ± 8	42 ± 10	<0.05
Serum IgM positive (%)	100%	25%	-
Serum IgG positive (%)	0%	100%	-
NLR	3.8	1.8	<0.05

Discussion

Our study demonstrated significant hematological differences between primary and secondary dengue infections, reinforcing the clinical importance of distinguishing between the two based on simple blood parameters and serological profiles. Secondary dengue infections were associated with markedly lower platelet counts, higher hematocrit levels, and elevated neutrophil-to-lymphocyte ratio (NLR), all of which are established indicators of increased disease severity.

Thrombocytopenia is one of the most recognized hematological abnormalities in dengue and was more pronounced in patients with secondary infections in our study. This severe thrombocytopenia can be attributed to both decreased platelet production and increased peripheral destruction. The immune response during secondary infection is enhanced due to prior sensitization to a different serotype, which triggers an exaggerated T-cell response and cytokine storm, resulting in increased capillary permeability and platelet consumption[2,4]. Srichaikul et al. reported that platelet counts were significantly lower in patients with dengue hemorrhagic fever (DHF), particularly in those with secondary infections, corroborating our findings[4].

Elevated hematocrit in secondary dengue patients is a clinical hallmark of plasma leakage and hemoconcentration, indicative of progression toward DHF or dengue shock syndrome (DSS). Our result showed a statistically significant rise

in hematocrit values among secondary dengue patients, consistent with the work of Kalayanarooj et al., who emphasized that rising hematocrit levels serve as an early warning sign of severe disease[5]. The pathophysiology involves increased vascular permeability due to cytokine-mediated endothelial dysfunction, a phenomenon more common in secondary infections due to antibody-dependent enhancement (ADE)[2].

Leukopenia, another classical finding in dengue, was present in both groups but more pronounced in secondary cases in our cohort. This finding may reflect suppression of the bone marrow by viral replication and immune-mediated destruction of white cells[2]. Although leukopenia is often seen in early dengue regardless of type, its severity and persistence tend to be greater in secondary infections.

Neutrophil-to-lymphocyte ratio (NLR) has emerged as a simple inflammatory marker to assess systemic stress and immune dysregulation. We found significantly higher NLR

values in the secondary dengue group, suggesting more intense inflammatory responses. Elevated NLR has been linked to severe dengue and poor outcomes in prior studies and may serve as a valuable prognostic tool in clinical practice[2,5].

The utility of IgM/IgG antibody testing in classifying dengue infection type is well established. IgM appears early in the course of a primary infection, whereas IgG is detected later. In secondary infections, IgG levels rise rapidly due to immunological memory, often outpacing IgM[6]. In our study, the serological profiles were crucial in appropriately categorizing patients and understanding the correlation between immune status and hematological alterations.

Overall, our findings align with earlier literature emphasizing the role of immune pathogenesis in disease severity during secondary dengue infections[2,3,4]. The combined use of CBC parameters and IgM/IgG serology provides a cost-effective, rapid, and widely accessible method to triage dengue patients in endemic and resource-limited settings. Such tools can help clinicians identify high-risk patients early and initiate appropriate supportive care, potentially reducing complications and mortality.

However, this study has certain limitations. The sample size was limited, and data were collected from a single centers, which may affect generalizability. Additionally, timing of blood sampling relative to disease progression may influence hematological values. Further multicenter studies with larger populations and longitudinal follow-up are recommended to validate these findings and define precise hematological cut-off values for predicting severe dengue.

Conclusion

Secondary dengue infection presents with significantly more severe hematological alterations than primary infection. Combined assessment of IgM/IgG profile and CBC parameters can aid in early risk stratification.

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PREOPERATIVE ELECTROLYTE STATUS OF ORAL SQUAMOUS CELL CARCINOMA ON UNDERGOING SURGERY PATIENTS IN A TERTIARY LEVEL HOSPITAL/DENTAL COLLEGE HOSPITAL

Mukhlachur Rahman[1], Fouad Al Hasanat[2], Mohibullah[3], Sultana Razia Khanam[4], Farzana Anar[5]

ABSTRACT

Introduction: Oral squamous cell carcinoma (OSCC) is a major global health concern, particularly in developing countries where risk factors such as tobacco use, betel nut chewing, and poor nutrition are prevalent. While the clinical and pathological aspects of OSCC have been widely studied, less attention has been given to preoperative biochemical markers such as electrolyte levels, which play a vital role in cellular function and overall homeostasis. Electrolyte imbalances in cancer patients can affect surgical outcomes, recovery, and prognosis. **Objective:** This study aims to assess the preoperative electrolyte status of OSCC patients and determine any significant changes in electrolyte levels during the preoperative period. **Methods:** This descriptive cross-sectional study was conducted in Dhaka Dental College Hospital, Bangladesh, from June 2022 to June 2023. A total of 93 OSCC patients were included using a purposive consecutive sampling technique. Preoperative blood samples were collected on Day-1 and Day-3, and electrolyte levels (sodium, potassium, calcium, and magnesium) were analyzed using standard laboratory protocols. Data were processed using SPSS version 23.0, and statistical comparisons were made using unpaired t-tests. **Results:** The mean age of the patients was 55.51±8.44 years, with a male predominance (53.76%). Most patients (76.34%) had a BMI below 18.5 kg/m², indicating a high prevalence of undernutrition. The most common habit associated with OSCC was betel nut chewing (51.61%), followed by betel nut with tobacco use (39.78%). Electrolyte analysis showed stable sodium (138.56±2.25 mmol/L to 138.27±2.21 mmol/L, $p=0.354$), potassium (4.16±0.50 mmol/L to 4.14±0.49 mmol/L, $p=0.775$), calcium (8.84±0.43 mg/dL to 8.82±0.47 mg/dL, $p=0.753$), and magnesium (1.94±0.27 mg/dL to 1.96±0.31 mg/dL, $p=0.627$) levels between Day-1 and Day-3, with no statistically significant changes ($p>0.05$). **Conclusion:** The study indicates that OSCC patients maintain stable electrolyte levels in the preoperative period despite high rates of malnutrition. These findings suggest that while electrolyte imbalances are not common, nutritional status should be carefully monitored. Further research is needed to explore the long-term impact of electrolyte levels on surgical and oncological outcomes in OSCC patients.

Keywords: Preoperative, Electrolyte, Status, Oral, Squamous, Cell, Carcinoma.

Date of submission: 09.12.2024

Date of acceptance after modification: 17.12.2024

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Citation: Preoperative Electrolyte Status of Oral Squamous Cell Carcinoma on Undergoing Surgery Patients in a Tertiary Level Hospital/Dental College Hospital. TMMC Journal 2025; 10(1):11-17.

Introduction

Oral squamous cell carcinoma (OSCC) is one of the most prevalent malignancies of the head and neck, accounting for a significant number of cancer-related deaths worldwide[1]. It is strongly linked to risk factors such as tobacco use, alcohol consumption, betel quid chewing, and poor oral hygiene[2,3]. Despite advances in diagnosis and treatment, OSCC continues to pose a major health burden, particularly in developing countries where these risk factors are more prevalent[4]. While much attention has been given to the clinical and pathological aspects of OSCC, there is increasing interest in the biochemical changes associated with the disease, particularly electrolyte imbalances. Electrolytes play a vital role in maintaining cellular function, nerve conduction, muscle contraction, and overall homeostasis[5]. Abnormal electrolyte levels have been reported in various malignancies and may influence disease progression, response to treatment, and patient outcomes[6,7]. In cancer patients, electrolyte disturbances can arise due to multiple factors, including tumor burden, poor nutritional status, systemic inflammation, renal dysfunction, and the side effects of cancer therapies[8,9]. In the surgical setting, preoperative electrolyte imbalances can increase the risk of complications, impact wound healing, and prolong hospital stays[10]. Despite the significance of these biochemical alterations, limited research has focused specifically on the preoperative electrolyte status of OSCC patients. This study aims to evaluate the preoperative electrolyte profiles of OSCC patients by analyzing a series of 93 cases. We seek to determine the prevalence and patterns of electrolyte imbalances and explore possible associations with clinical parameters such as tumor stage, nutritional status, and comorbidities. Identifying these imbalances could help improve perioperative management by allowing early correction of abnormalities, potentially reducing surgical risks and enhancing postoperative recovery[11,12]. By shedding light on the electrolyte disturbances in OSCC patients, this study adds to the growing understanding of the metabolic aspects of head and neck cancers. The findings may assist clinicians in optimizing preoperative preparation and overall patient care, ultimately improving treatment outcomes.

METHODS

This descriptive type of cross-sectional study was conducted at the department of Department of Oral & Maxillofacial Surgery, Dhaka Dental College Hospital, Dhaka, Bangladesh during June 2022 to June 2023. Written informed consent was taken and a total of 93 patients aged 18 and above, who were clinically and histopathologically diagnosed as OSCC would report to the Department of Oral & Maxillofacial Surgery of Dhaka Dental College Hospital, Dhaka, Bangladesh were enrolled in this study. Purposive consecutive sampling technique was used in this study. The demographic data were collected by face to face interview and clinical data were collected by previous case history with a restructured questionnaire and a case record form. To determine the preoperative electrolyte status of the study patients, the blood samples of day-1 and day-3 of the enrolled preoperative patients were collected and sent to the central lab of the hospital and a standard protocol was used to determine the level of electrolyte of the patients. The collected data were organized and entered into computer. Then the data were analyzed by using Statistical Package for Social Sciences (SPSS) software, version-23.0. Descriptive statistical analysis were performed and the results were presented in table and charts. Statistical comparisons were made using unpaired t-tests, where $p < 0.05$ considered as the level of significance with 95% CI. The ethical clearance of this study was obtained from the Ethics Committee of Dhaka Dental College and Hospital, Dhaka, Bangladesh.

Inclusion criteria:

- Patient undergoing oral squamous cell carcinoma surgery
- Patient hospitalized for > 3 days

Exclusion criteria:

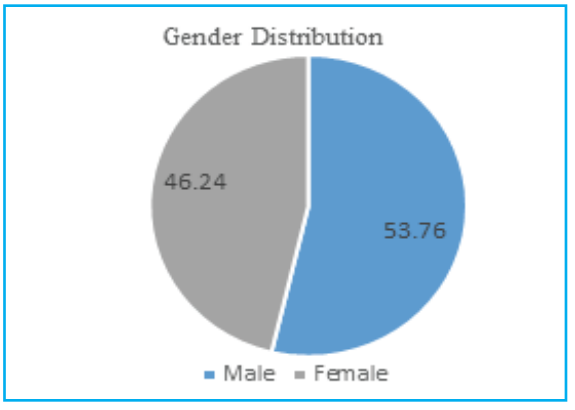
- OSCC patients having severe co-mobility like lever disease, kidney disease uncontrolled diabetes mellitus, steroid therapy
- Patients unwilling to participate in the study.

RESULTS

Table 1: Demographic characteristics of the study patients (N=93).

Age Groups (years)	Frequency	Percent
18-30	1	1.07
31-40	4	4.30
41-50	15	16.12
51-60	36	38.70
61-70	31	33.33
71-80	6	6.45
Total	93	100
Mean age (years)	55.51±8.4 4	
Sex		
Male	50	53.76
Female	43	46.24
Total	93	100
Socio -economic condition		
Upper class	16	17.20
Middle class	23	24.73
Lower class	54	58.06
Total	93	100
Residence		
Urban	34	36.55
Rural	59	63.44
Total	93	100

Table 1: shows the baseline characteristics of the study patients. According to the age distribution, the most frequent 36(38.70%) patients belonged to the age group (51-60) years and followed by 31(33.335), (61-70) years 15(16.12)%, (41-50) years, 6(6.45%) (71-80) years, 4 (4.30%), (31-40) years, 1(1.07%), (18-30). The mean age of the patients was 55.51±8.44 years. According to the sex distribution, 56(60.21%) patients were male and the female patients were 43(46.23%). The most frequent socio-economic condition of the patients was observed lower class 54(58.06%). The majority of the patients were from rural area 59(63.44%) and 34(36.55%) patients were from urban area.



Figer-1: shows the gender distribution of the study patients (N=93).

Table 2: Distribution of BMI status of the study patients (N=93).

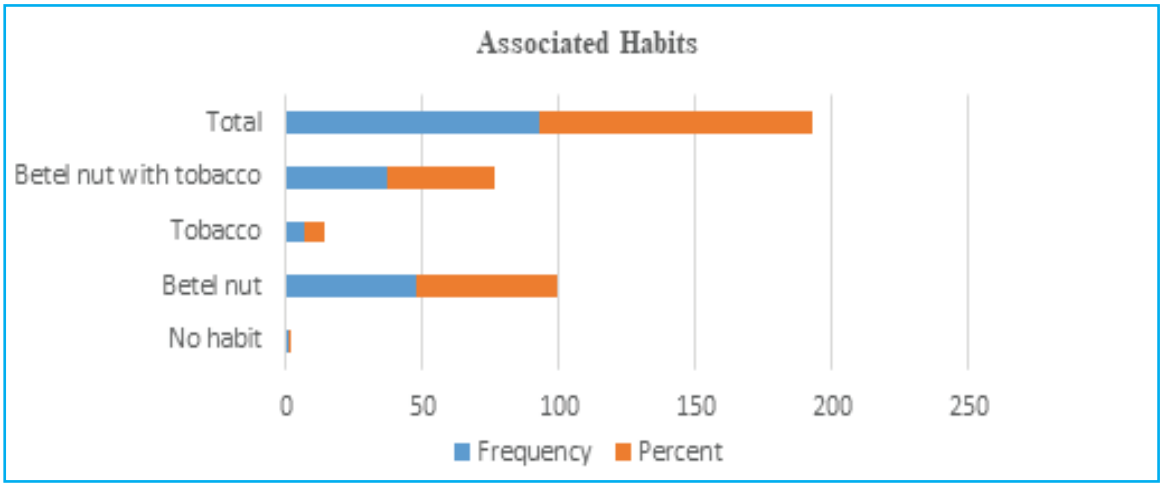
Body Mass Index (BMI)	Frequency	Percentage
<18.5 kg/m^2	71	76.34
18.5-29.9 kg/m^2	22	23.65
Total	93	100
Mean BMI	18.20±0.60 kg/m^2	
Minimum	17 kg/m^2	
Maximum	19 kg/m^2	

Table 2 presents the distribution of Body Mass Index (BMI) of the study patients. The majority 71(76.34%) patients had a BMI below 18.5 kg/m², indicating underweight status, while 22(23.65%) patients fall within the 18.5-29.9 kg/m² range, which includes normal weight and overweight categories. The mean BMI was 18.20±0.60 kg/m², with values ranging from a minimum of 17 kg/m² to a maximum of 19 kg/m².

Table 3: Patients habit associated with the oral squamous cell (N=100).

Habit of the patients	Frequency	Percent
No habit	1	1.07
Betel nut	48	51.61
Tobacco	7	7.52
Betel nut with tobacco	37	39.78
Total	93	100

Table 3 shows the distribution of the habit associated with the oral squamous of the study patients. According to the habit associated with the oral squamous distribution, 48(51.61%) of patients had the habit of betel nut and followed by 37(39.78%) of patients had betel nut with tobacco, 7(7.52%) of patients had tobacco 1(1.07%) of patients had no habit.

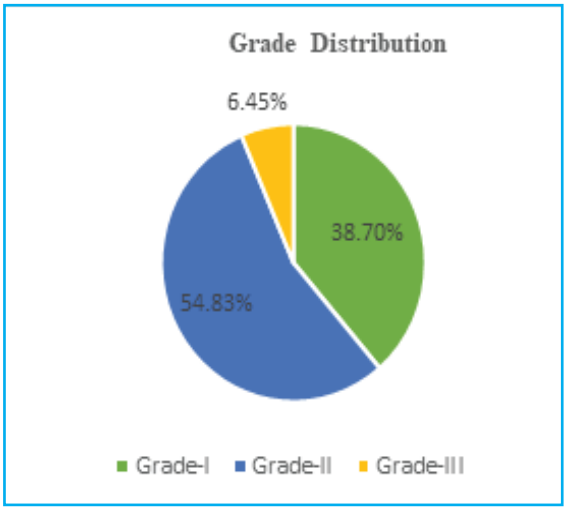


Figer -1I shows the associated habits with the study patients (N=93).

Table 4: Histological grading of the oral squamous cell carcinoma with the study patients (N=93).

Histological Grading	Frequency	Percent
Grade-I	36	38.70
Grade-II	51	54.83
Grade-III	6	6.45
Total	93	100

Table 4 shows the distribution of pre surgical histological grading of the oral squamous observed of the study patients. According to the distribution of pre surgical histological grading, 51(54.83%) of patients had Grade-II and followed by 36(38.70%) of patients had Grade-I and 6(6.45%) of patients had Grade-III.



Figer -3: Shows the histological grading of the oral squamous cell carcinoma (N=93).

Table 5: Preoperative electrolyte status among the study patients (n=93).

Pre-operative Electrolyte	Day-1	Day-3	P-Value
	Mean± SD	Mean± SD	
Sodium(Na+)	138.56±2.25	138.27±2.21	0.354
Potassium(K+)	4.16±0.50	4.14±0.49	0.775
Calcium(Ca)	8.84±0.43	8.82±0.47	0.753
Magnesium(Mg)	1.94±0.27	1.96±0.31	0.627

*Unpaired t tests were performed to compare the group mean at the level of significance 0.05 with 95%CI.

Table-5 presents pre-operative and post-operative (Day-1 and Day-3) electrolyte levels, showing mean values and standard deviations for sodium (Na⊠), potassium (K^+), calcium (Ca), and magnesium (Mg). Sodium levels slightly decreased from 138.56±2.25 mmol/L pre- operatively to 138.27±2.21 mmol/L on Day-3 (p=0.354), while potassium levels remained stable at 4.16±0.50 mmol/L and 4.14±0.49 mmol/L (p=0.775). Calcium levels showed a minor decrease from 8.84±0.43 mg/dL to 8.82±0.47 mg/dL (p=0.753), and magnesium levels slightly increased from 1.94±0.27 mg/dL to 1.96±0.31 mg/dL (p=0.627). All p-values indicate no statistically significant differences, suggesting stable electrolyte homeostasis post-operatively.

Discussion

Electrolyte imbalances are a common concern in cancer patients due to factors such as poor nutrition, tumor burden, systemic inflammation, and treatment-related effects[13]. In this study, we evaluated the preoperative electrolyte status of OSCC patients to determine whether significant imbalances occur before surgery. Our findings indicate that sodium, potassium, calcium, and magnesium levels remained relatively stable between Day-1 and Day-3, with no statistically significant differences. These results suggest that OSCC patients, despite their high prevalence of malnutrition, do not typically experience severe electrolyte disturbances in the preoperative period. Our findings align with a study by Kalaiselvi et al.[14], which reported that most head and neck cancer patients undergoing surgery did not present with critical electrolyte imbalances preoperatively. However, some studies have shown conflicting results. Sharma et al.[15] found that cancer patients undergoing chemotherapy and radiotherapy were more likely to experience electrolyte disturbances, particularly hypokalemia and hyponatremia. This difference could be attributed to the effects of cancer treatments rather than the disease itself. Since our study focused solely on preoperative patients who had not yet undergone therapy, this may explain why electrolyte fluctuations were not significant. Nutritional status is another key factor influencing electrolyte levels in cancer patients. In our study, 76.34% of patients had a BMI below 18.5 kg/m², indicating a high prevalence of undernutrition. Malnutrition has been linked to electrolyte imbalances due to inadequate dietary intake and muscle wasting, which affects intracellular electrolyte stores[16]. Despite this, our patients maintained relatively stable sodium, potassium, calcium, and magnesium levels. One possible explanation is that the body's compensatory mechanisms, such as renal adjustments and hormonal regulation, help maintain electrolyte balance even in malnourished states[17]. Similar findings were observed in a study by Patel et al.[18], which reported that although head and neck cancer patients had poor nutritional status, their electrolyte profiles remained within normal ranges due to physiological adaptations. Another noteworthy finding is the predominant use of betel nut and tobacco among OSCC patients, with 51.61% of patients reporting betel nut chewing and 39.78% using betel nut with tobacco. Previous research has suggested that prolonged use of these substances may contribute to metabolic and electrolyte disturbances[19].

However, our study did not find a direct correlation between these habits and altered electrolyte levels, indicating that more targeted research is needed to explore this potential relationship. Surgical outcomes can be affected by preoperative electrolyte imbalances, as abnormal sodium, potassium, and calcium levels have been linked to increased complications such as cardiac arrhythmias, delayed wound healing, and prolonged hospital stays[20]. The stability of electrolyte levels observed in our study is reassuring, as it suggests that most OSCC patients do not require aggressive preoperative electrolyte correction. However, given the high prevalence of malnutrition, routine monitoring remains crucial to prevent any hidden deficiencies from affecting surgical outcomes. Finally this study suggests that preoperative electrolyte imbalances are not a major concern in OSCC patients, despite a high prevalence of malnutrition.

Limitations of the Study

A limitation of our study is its relatively small sample size and single-center design, which may not be representative of all OSCC patients. Additionally, we did not assess long-term postoperative electrolyte trends, which could provide further insight into how surgery and subsequent treatments impact electrolyte balance over time. Future research should include a larger sample size and longitudinal follow-up to better understand the implications of electrolyte status in OSCC patients.

CONCLUSION

The study indicates that OSCC patients maintain stable electrolyte levels in the preoperative period despite high rates of malnutrition. These findings suggest that while electrolyte imbalances are not common, nutritional status should be carefully monitored. Further research is needed to explore the long-term impact of electrolyte levels on surgical and oncological outcomes in OSCC patients.

Recommendations

Based on our findings, we recommend that preoperative electrolyte levels in OSCC patients be routinely monitored, especially in those with severe malnutrition or other risk factors for biochemical imbalances. Although significant electrolyte disturbances were not observed in this study, maintaining optimal nutritional status should remain a priority to enhance surgical recovery and overall treatment outcomes. Future research should explore the long-term effects of electrolyte fluctuations postoperatively and during cancer treatment, as well as the impact of dietary interventions on electrolyte stability in OSCC patients.

Funding: Self-funding.

Conflict of Interest: None declared

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IRON STATUS AND SIMPLE FEBRILE SEIZURE IN YOUNG CHILDREN: A CASE- CONTROL STUDY

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ABSTRACT

Background: Febrile seizures represent the most common type of seizure in early childhood, and many factors that increase seizure risk have been identified. Iron deficiency anemia (IDA) and iron deficiency has emerged as a possible modifiable risk factor, though evidence remains varied across populations and clinical settings. **Objectives of the study:** The main objective is to see the association between iron deficiency anemia and simple febrile seizures among young children presenting to a tertiary hospital in Gazipur, Bangladesh. **Methods:** A prospective case-control study was performed over a one-year period, involving 70 children aged 6 months to 6 years. Thirty five (35) children with a diagnosis of simple febrile seizure constituted the case group, while 35 age- and sex-matched children with acute febrile illness without any h/o seizure activity served as controls. Comprehensive hematological assessments, including hemoglobin, mean corpuscular volume (MCV), serum ferritin and serum iron levels were performed. Statistical analyses were conducted using appropriate parametric and non-parametric tests, with a significance level set at $p < 0.05$. **Results:** Cases with simple febrile seizures were found to have significantly lower levels of hemoglobin (mean: 9.6 ± 1.0 g/dL), MCV (67.4 ± 4.6 fL), serum ferritin (10.8 ± 4.3 ng/mL)and serum iron(35.6±10.9 μ g/dL)compared to controls (11.1 ± 1.1 g/dL, 75.1 ± 5.1 fL, 21.5 ± 5.8 ng/mL,58.7 ± 12.4 μ g/dL respectively; $p < 0.001$ for all). The prevalence of iron deficiency anemia was markedly higher among cases than controls (71.43% vs. 31.43%), with an odds ratio of 6.0 (95% CI: 2.2–16.5). **Conclusion:** These observations suggest that risk of febrile seizures increases in iron deficiency even prior to development of anemia (IDA).

Keywords: Simple febrile seizure, iron deficiency anemia, hemoglobin, serum ferritin, case-control study, Bangladesh

Date of submission: 15.12.2024

Date of acceptance after modification: 21.12.2024

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Citation: Iron status and simple febrile seizure in young children: A case- control study. TMMC Journal 2023; 10(1):18-26.

Introduction

Febrile seizures are the most common neurological disorder, characterized by generalized tonic-clonic convulsions occurring in the presence of fever in otherwise neurologically healthy children aged between 6 months and 6 years.[1] It may occur 25% of all children below five years of age.[2] Among the hospitalized seizure patients (2 months to 12 years) 38% are due to febrile convulsion in Bangladesh.[3] Febrile seizure (FS) episodes are frightening and agonizing to the parent and child. It can cause psychological trauma to both, though most of the FS are benign and self limiting.[4] Febrile seizures have a multifactorial pathogenesis.[5] Genetic susceptibility, age, the severity and duration of fever, and the individual's underlying nutritional status, are thought to contribute to the occurrence of febrile seizures (FS). Among these factors, iron deficiency anemia (IDA) has gathered considerable research interest due to its potential role in modifying neurophysiological thresholds. Each single factor cannot explain seizure generation but the association of the multiple factors in different individuals can trigger febrile seizures.[6] Children with simple FS have approximately the same risk of developing epilepsy by the age 7 years that is 1%, as does the general population. Children suffering from complex FS, there is 6-49% increased risk of subsequent development epilepsy.[7] Iron deficiency anemia (IDA) one of the most prevalent nutritional problem especially in developing countries like Bangladesh and commonly occurs between the age of 6 and 24 months. There are 46-66% of children under 4 years who are anemic with half attributed to IDA in developing countries.[6] Iron is an important micronutrient, plays a vital role in neurochemical reactions and neurological functions like neurotransmitter metabolism, myelin formation and brain energy metabolism.[6] Low level of plasma ferritin-which occur in iron deficiency or in IDA during early childhood, a crucial period when rapid brain growth and development and neural maturation take place, can lower the seizure threshold and increase a child's susceptibility to experiencing convulsions, particularly during acute febrile illnesses with rise of body temperature.[8] Several studies conducted in different parts of the world have examined the association between FS and IDA, with findings suggesting that children with iron deficiency may be more susceptible to experiencing seizures during febrile illnesses compared to those with normal iron levels.[8] FS and IDA are common public health problems in early childhood in Bangladesh due to recurrent childhood infections, limited access to healthcare, and widespread nutritional deficiencies, examining the relationship between these two conditions becomes especially relevant.[9] Keeping in view the prevalence of these two common childhood problems as well as difference of opinions in available studies, the main objective of this study is to evaluate the potential association between simple febrile seizures and iron deficiency including iron deficiency anemia (IDA) in children.

Methodology & Materials

This case-control study was carried out at the Department of Pediatrics & Neonatology, Tairunnessa Memorial Medical College & Hospital (TMMC&H), Gazipur, Bangladesh during January 2023 to December 2023. Ethical clearance for this study was obtained from the ethical committee. Participants were selected using purposive random sampling. Guardians of eligible children were approached, and written informed consent was obtained before enrollment. A total of 70 children were included in the study, with equal numbers in case and control groups.

Children aged 6 months to 6 years presenting with fever (≥38°C), with or without seizures, were enrolled from both outpatient and inpatient departments. Participants were categorized into two groups:

Cases: Children presenting with their first episode of febrile seizure, defined according to World Health Organization (WHO) criteria as seizures occurring in febrile children without evidence of intracranial infection, metabolic disturbance, or history of afebrile seizures.[10]

Controls: Age- and sex-matched children presenting with fever (≥38°C)(<3 days) without any seizure activity now or before.

Inclusion and Exclusion Criteria

Inclusion Criteria

- Children between 6 months and 6 years of age
- Seizure occurring during a febrile episode (≥38°C)
- Generalized tonic-clonic seizures lasting <15 minutes
- No prior history of afebrile seizures
- Normal neurodevelopmental status
- No evidence of central nervous system infection or structural brain abnormalities

Exclusion Criteria

- Children <6 months or >6 years of age
- Focal seizures or seizures lasting >15 minutes
- Recurrent seizures in the same febrile episode
- Known neurological or developmental disorders
- History of epilepsy or previous afebrile seizures
- Evidence of meningitis, encephalitis, or other intracranial infections
- Metabolic or electrolyte imbalances (e.g., hypoglycemia, hyponatremia, hypocalcemia)
- Recent iron supplementation (within the last three months)

Where clinically indicated, additional diagnostic investigations such as lumbar puncture, CT head, or serum studies (electrolytes, glucose, complete blood count) were performed to exclude alternative diagnoses.

Data Collection and Assessment of Iron Deficiency Anemia

Demographic and background informations of the study population-including age, sex, place of residence, family history of seizures, and history of iron supplementation-were collected through structured interviews conducted with parents or legal guardians. The type and classification of febrile seizure were retrieved from medical records based on clinical documentation at the time of presentation. Body temperature of the cases and controls were mesured using a calibrated tympanic thermometer and recorded by attending physicians. Prior to blood sampling, it was confirmed that none of the participants had received iron supplementation in the three months preceding enrollment. A fasting venous blood sample (4 mL) was drawn from each child and sent to the hospital's central laboratory for analysis. Complete blood count (CBC) with differential, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), serum iron, total iron- binding capacity (TIBC), and serum ferritin levels were assessed. Laboratory analyses were conducted using standardized instruments, including the 18-parameter Sysmex KX-21N hematology analyzer for CBC, the 717 Hitachi auto-analyzer for serum iron and TIBC (using chromatography), and the Genesis-Camna1 gamma counter for ferritin measurement via a radioimmunoassay (RIA) kit. All laboratory testing was performed by skilled technician blinded to the study objectives under supervision of laboratory medicine specialist and participant group allocation. Interpretation of the laboratory results was conducted by a pediatrician who was also blinded to group assignments to prevent

diagnostic bias. Diagnostic thresholds for iron deficiency anemia were established based on age-specific hematologic indices. For children aged 6months to 24 months, IDA was defined as hemoglobin (Hb) < 10.5 g/dL, hematocrit (Hct) < 33%, MCV < 70 fL, MCH < 23 pg, MCHC < 30 g/dL, and red blood cell count (RBC) < 3.7 × 10^6/mm^3. For children aged 2yrs to 6 years, IDA was defined as Hb < 11.5 g/dL, Hct < 34%, MCV < 75 fL, MCH < 24 pg, MCHC < 31 g/dL, and RBC < 3.9 × 10^6/mm^3.Serum ferritin level < 12ng/ml was confirmatory for diagnosing IDA. Peripheral blood smear findings, along with red cell indices (MCV, MCH, MCHC), were used to exclude other potential causes of anemia such as thalassemia or vitamin B12 deficiency.[11]

Statistical Analysis

All the collected data were checked and verified. The data were compiled, analyzed and then tabulated according to key variables. Data were analyzed using SPSS version 23, for Windows XP. Descriptive statistics were used to summarize demographic and clinical characteristics. Categorical variables were compared using the Chi-square test or Fisher's exact test, and continuous variables were compared using the independent t-test or Mann–Whitney U test, based on data distribution. Multivariate logistic regression analysis was performed to calculate adjusted odds ratios (OR) with 95% confidence intervals (CI), assessing the independent association between iron deficiency anemia and simple febrile seizures. A p-value < 0.05 was considered statistically significant.

Result

Table 1: Demographic characteristics of study population (n= 70).

Variables	Simple febrile Seizure (n=35)		Fever without Seizure (n=35)		p-value
	n	%	n	%	
Age (years)					
Mean±SD	2.1 ± 0.8		2.0 ± 0.7		0.35
Gender					
Male	23	65.71	21	60.00	0.57
Female	12	34.29	14	40.00	
Birth Weight (kg)					
Mean±SD	2.78 ± 0.35		2.95 ± 0.33		0.01*
Infancy nutrition					
Breast milk	29	82.86	29	82.86	0.54
Formula	1	2.86	3	8.57	
Both	5	14.29	3	8.57	
Birth Status					
Preterm	5	14.29	1	2.86	0.21
Term	28	80.00	32	91.43	
Post Term	2	5.71	2	5.71	
Type of Deliver y					
Natural childbirth	24	68.57	26	74.29	0.61
Cesarean section	11	31.43	9	25.71	
Birthday (Child birth Order)					
First child	15	42.86	14	40.00	0.52
Second child	12	34.29	13	37.14	
Third child	8	22.86	8	22.86	
Residence Place					
Urban	26	74.29	23	65.71	0.65
Rural	9	25.71	12	34.29	

Table 2: Clinical characteristics of study population

Variable	Simple Febrile Seizure (n=35)		Fever without Seizure (n=35)		p-value
	n	%	n	%	
Previous seiz ure history					
Yes	3	8.57	1	2.86	0.14
No	32	91.43	34	97.14	
Family history of seizure					
Yes	10	28.57	2	5.71	0.002*
No	25	71.43	33	94.29	
History of recurrent infection	12	34.29	6	17.14	0.03*
Treated with diazepam	22	62.86	0	0.00	0
Immunization status complete	28	80.00	30	85.71	0.38
Duration of fever before seizure (hours)					
Mean±SD	9.8 ± 2.9		10.1 ± 2.7		0.42

Table 3: Comparison of major indices for iron state in children with febrile seizures and control group

Parameter	Simple febrile Seizure (mean ± SD) (n=35)	Fever without Seizure (mean ± SD) (n=35)	p-value
Hemoglobin (g/dL)	9.6 ± 1.0	11.1 ± 1.1	<0.001*
Serum Ferritin (ng/mL)	10.8 ± 4.3	21.5 ± 5.8	<0.001*
Serum Iron (µg/dL)	35.6 ± 10.9	58.7 ± 12.4	<0.001*
Total Iron Binding Capacity (µg/dL)	392 ± 24.2	345 ± 28.7	<0.001*
Hematocrit (%)	31.1 ± 3.5	34.7 ± 3.6	<0.001*
MCV (fL)	67.4 ± 4.6	75.1 ± 5.1	<0.001*
MCH (pg)	21.6 ± 2.4	25.3 ± 2.6	<0.001*
MCHC (g/dL)	30.2 ± 1.2	31.5 ± 1.3	<0.001*
RDW (%)	17.9 ± 1.7	14.8 ± 1.2	<0.001*
RBC (million/µL)	4.3 ± 0.4	4.5 ± 0.5	0.02*
WBC (/cumm)	10,200 ± 2,000	9,800 ± 1,900	0.23
Platelet count (/cumm)	312,000 ± 64,000	321,000 ± 61,000	0.41

Table 4: Prevalence of iron deficiency anemia among study population

IDA Status	Simple febrile Seizure (n=35), n (%)	Fever without Seizure (n=35), n (%)	Odds Ratio (95% CI)	p-value
IDA Present	25 (71.43)	11(31.43)	6.0 (2.2–16.5)	<0.001*
IDA Absent	10 (28.57)	24(68.57)		

Table 5: Logistic Regression Analysis of Factors Associated with Simple febrile Seizure

Variable	Adjusted OR (95% CI)	p-value
Iron Deficiency Anemia (yes)	4.76 (2.03–11.17)	<0.001*
Family history of seizures (yes)	3.12 (1.09–8.91)	0.034*
Recurrent infections (yes)	2.13 (1.01–4.47)	0.048*
Birth weight <2.5 kg	1.92 (0.89–4.16)	0.09
Male sex	1.21 (0.59–2.49)	0.61

Discussion

Febrile seizures are perhaps one of the most prevalent causes of admittance to pediatric emergency wards worldwide. There are various potential contributing factors of which iron deficiency anemia (IDA) has emerged as a modifiable biological determinant. Iron deficiency increases extracellular dopamine and nor-epinephrine levels in the caudateputamen and decreases the levels of dopamine D1 and D2 receptors and monoamine transmitters.[12]

Alteration and disruption of brain metabolism and neurotransmission due to iron deficiency in major brain structures such as the basal ganglia and hippocampus can cause to increase the risk of developing febrile seizures.[13]

In this study, iron deficiency anemia (IDA) with low serum iron was significantly more prevalent among children with febrile seizures (71.4%) compared to those with fever but no seizures (31.4%). Notably, the adjusted odds ratio indicated that children with IDA were approximately 6.0 times more likely to experience febrile seizures ($p < 0.001$), even after controlling for potential confounders. This finding is consistent with a growing body of literature suggesting that iron deficiency may play a contributory role in the pathogenesis of febrile seizures. Iron- deficiency anemia (IDA) was present in 45% of children with febrile seizures (FS) in a Bangladeshi case-control study, compared to only 10% in the control group, yielding an odds ratio of 7.36. This finding is statistically significant and which is similar to our study.[7] Our findings are also consistent with those of Fallah et al. (2009), where children experiencing febrile seizures were more likely to have iron deficiency compared to febrile children without seizures.[14] Similarly, Pisacane et al. (1996) identified a markedly higher prevalence of iron deficiency among children with FS and proposed a role for iron in modulating neuronal excitability and thermoregulation.[15] Sadeghzadeh et al. (2012) hypothesized that iron deficiency may reduce the seizure threshold by disrupting neurotransmitter metabolism and enzymatic activity within the central nervous system.[16]

Billoo also demonstrated a significantly higher frequency of IDA in children with febrile seizures compared to those with other febrile illnesses was evident.[17] In contrast to the findings of our study, several investigations have failed to establish a significant association between iron deficiency anemia (IDA) and febrile seizures (FS). For instance, Kobrinsky et al. observed a lower prevalence of iron deficiency among children with febrile seizures, suggesting a potential protective role of iron deficiency against FS.[18] Bidabadi et al. reported a slightly lower

proportion of iron deficiency in the febrile seizure group (44%) compared to the control group (48%); however, the difference was not statistically significant, and thus, the hypothesized protective effect of iron deficiency could not be substantiated.[19] Significantly lower hemoglobin concentrations and serum iron levels in children with febrile seizures (FS) was observed in this study, while total iron-binding capacity (TIBC) was notably elevated. These hematologic parameters are consistent with iron deficiency anemia and support the clinical diagnosis. Similar laboratory markers have been consistently reported in previous case-control studies investigating the relationship between iron status and FS.[16] Furthermore, in our study, the mean serum ferritin concentration was significantly lower among children with febrile seizures but it is recognized that ferritin also functions as an acute-phase reactant and may be elevated in the presence of infection or inflammation, potentially complicating its diagnostic interpretation.[20] To address this, we evaluated serum ferritin levels in conjunction with other iron parameters, such as serum iron and total iron- binding capacity, to ensure a more accurate assessment of iron status. Consistent with our findings, previous studies by Daoud et al., Rehman and Billoo, and Moeman et al. reported significantly lower plasma ferritin levels in children with febrile convulsions compared to controls.[17,21,22] Positive family history of seizures has emerged as a significant predictor in our regression model (OR=3.12, p=0.034), echoing the findings of several earlier studies that emphasized the importance of genetic predisposition in febrile seizure susceptibility.[16]

Conclusions

The present study concluded that iron deficiency anemia and iron deficiency both were significantly higher in children suffering from febrile seizures than febrile children without seizure. So there was strong association between iron deficiency anemia and febrile seizure in children. Serum ferritin level was also found significantly lower in the cases which indicated that a low ferritin level may have an important role in children for developing febrile seizures.

Recommendations

Therefore this study suggested that children presenting with febrile seizure should be tested for iron profile and oral supplemental iron therapy may be given to those children suffering from febrile seizures. However the sample size in this study was not enough for a definite conclusion and therefore, a multicenter study with more cases and a sufficient follow-up is needed.

Funding: No funding sources

Conflict of interest: None declared

Limitations of the study: As it was a hospital –based study, the result of association may be different from a community setting. More over sample size was small and duration of study was short.

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ROLE OF ULTRASONOGRAPHY AND CT IN EARLY DETECTION OF HEPATIC METASTASES IN SUSPECTED GIT MALIGNANCY

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ABSTRACT

Background: Despite advancements in imaging technologies, there remains no definitive consensus on the most sensitive modality for detecting hepatic metastases. This uncertainty is particularly significant in resource-limited settings, where early and accurate diagnosis is crucial for timely intervention. Therefore, the purpose of this study is to evaluate the comparative effectiveness of ultrasonography and computed tomography in the early detection of hepatic metastases in patients with suspected gastrointestinal tract malignancies. **Methods:** This cross-sectional study at the Department of Radiology and Imaging, BSMMU, Dhaka (Oct 2018–Sep 2019), included 50 surgically treated patients with suspected hepatic metastases from GIT cancer. Using purposive sampling, data were collected via questionnaire, USG (Philips Affinity 30), and CT (HITACHI SCENARIA 64-slice) scans, interpreted by blinded radiologists and compared with histopathology. Analysis used SPSS v22. **Results:** In 50 suspected GIT cancer cases (66% male, mean age 57.9), common symptoms included anemia (78%), nausea (74%), and weight loss (72%). Imaging revealed well-defined margins (USG 72%, CT 76%), multiple lesions (USG 84%, CT 90%), and bilobar involvement (68%). CT showed superior diagnostic performance over USG: higher sensitivity (95.7% vs. 89.4%), specificity (83.3% vs. 66.7%), accuracy (94.3% vs. 88.0%), and negative predictive value (71.4% vs. 28.6%), while both had similar positive predictive values (~97.7%). **Conclusion:** Computed tomography (CT) is more accurate and reliable than ultrasonography (USG) for early detection of hepatic metastases in suspected gastrointestinal tract malignancy.

Keywords: Ultrasonography, Computed Tomography, Hepatic Metastases, GIT Malignancy, Early Detection.

Date of submission: 16.12.2024

Date of acceptance after modification: 21.12.2024

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Citation: Role of Ultrasonography and CT in Early Detection of Hepatic Metastases in Suspected Git Malignancy. TMMC Journal 2025; 10(1):26-32.

Introduction

The liver is among the most common sites of metastatic disease, particularly from gastrointestinal tract (GIT) malignancies[1,2]. Secondary hepatic tumors occur far more frequently than primary liver cancers, with colorectal, gastric, pancreatic, breast, and lung cancers being the primary sources[3]. This high incidence is largely due to the liver's dual blood supply from the portal vein and hepatic artery, and its unique microenvironment that facilitates malignant cell entrapment and growth[4]. Hepatic metastases can appear as solitary lesions, diffuse infiltrations, or cystic and calcified deposits, depending on the primary tumor type[5]. Early detection is critical, as timely interventions-such as resection, chemotherapy, or ablation-can significantly improve outcomes, especially in oligometastatic cases.

Imaging plays a central role in detecting and characterizing liver metastases, guiding treatment decisions. Ultrasonography (US), commonly used as an initial modality due to its accessibility and low cost, has limited sensitivity-particularly for lesions under 10 mm or those isoechoic to liver parenchyma[6]. Its diagnostic performance may also be affected by factors like obesity or poor acoustic windows[7]. Contrast-enhanced computed tomography (CT), by contrast, offers higher sensitivity and specificity, particularly for lesions >1 cm. While MRI and PET scans provide superior accuracy, their cost and limited availability restrict routine use in many settings[8].

Despite technological advancements, there is no clear consensus on the most effective imaging modality for early detection of hepatic metastases. Some studies suggest CT outperforms US, while others report comparable results, especially with newer techniques like contrast-enhanced ultrasonography and SPIO-enhanced MRI[9-12].

In clinical practice, imaging choices often depend on resource availability and institutional protocols. Thus, evaluating the comparative performance of ultrasonography and CT remains crucial-particularly in early diagnosis where timely intervention can improve survival. Despite the pivotal role of imaging, variability in accuracy and inconsistent evidence in real-world settings underscore a significant knowledge gap. Therefore, the purpose of this study is to evaluate the comparative effectiveness of ultrasonography and computed tomography in the early detection of hepatic metastases in patients with suspected gastrointestinal tract malignancies.

Objective

- To assess the comparative effectiveness of ultrasonography and computed tomography in the early detection of hepatic metastases in patients with suspected gastrointestinal tract malignancies

Methodology & Materials

This cross-sectional study was conducted in the Department of Radiology and Imaging at Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, over a one-year period from October 2018 to September 2019. The study population consisted of patients with suspected hepatic metastases from diagnosed cases of gastrointestinal (GIT) cancer who were referred for imaging and scheduled for surgical intervention. A total of 50 participants were selected using purposive sampling based on the following inclusion and exclusion criteria.

Inclusion Criteria

- Patients with suspected hepatic metastases from a diagnosed case of GIT cancer
- Patients undergoing surgery for GIT cancer

Exclusion Criteria

- Hepatic metastases originating from a non-GIT primary or an unknown primary
- Patients with abnormal bleeding profiles
- Patients with elevated serum creatinine levels
- Patients with liver cirrhosis

Data were collected using a pre-tested structured questionnaire, ultrasonography (USG) machine (Philips Affinity 30, USA), computed tomography (CT) scanner (HITACHI SCENARIA 64-slice Multidetector CT), and histopathological reports. Each patient underwent both USG and CT imaging. Ultrasonography was performed by a blinded radiologist using a convex transducer (2-6 MHz) in multiple planes to evaluate hepatic lesions. CT imaging was done using both pre- and post-contrast phases, with 50 ml of iodinated contrast (Iopamiro 370), and interpreted by a separate blinded radiologist. Findings from both imaging modalities were compared with histopathology, which served as the gold standard. Key variables analyzed included demographic characteristics (age, sex), and imaging features such as lesion margin, number, lobar distribution, echopattern/density, enhancement pattern, thrombosis, and calcification. All data were analyzed using IBM SPSS Statistics version 22.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were presented as frequencies, percentages, means, and standard deviations. McNemar's test and chi-square test were used where appropriate. The results were summarized in tables and figures. Ethical clearance was obtained from the Institutional Review Board (IRB) of BSMMU prior to the commencement of the study. Written informed consent was obtained from each participant after explaining the study's purpose, procedures, potential risks, and the right to withdraw at any time. Patient confidentiality was strictly maintained throughout the study.

Results

A cross-sectional analytical study was conducted in the Department of Radiology and Imaging at BSMMU, Dhaka. A total of 50 patients were selected based on predefined inclusion and exclusion criteria, comprising 33 males and 17 females.

In Table I, the demographic characteristics of the study population showed that the largest age group was 50-59 years, with 17 patients (34%), followed by 13 patients (26%) in the 60-69 years group. The mean age was 57.9±17.8 years (range: 26-85 years). The sex distribution showed 33 males (66%) and 17 females (34%).

In Table II, the clinical features observed in the study population revealed anemia as the most common feature, present in 39 individuals (78%), followed by nausea and anorexia in 37(74%), and weight loss in 36(72%).

Table III compares key imaging variables assessed by ultrasonography (USG) and computed tomography (CT). Well-defined lesion margins were seen in 36 patients (72%) on USG and 38(76%) on CT, while ill-defined margins were observed in 14(28%) and 12(24%) respectively. Multiple lesions were detected in 42 patients (84%) by USG and 45 (90%) by CT; single lesions were seen in 8(16%) and 5(10%) respectively. Both lobes of the liver were involved in 34 patients (68%) and a single lobe in 16(32%) by both modalities.

In Table IV, diagnostic findings of USG and CT were compared with histopathology. USG revealed 42 true positives, 1 false positive, 5 false negatives, and 2 true negatives. CT identified 45 true positives, 1 false positive, 2 false negatives, and 2 true negatives.

Table V summarizes the diagnostic performance of both imaging modalities. CT demonstrated higher sensitivity (95.74%) compared to USG (89.36%), as well as greater specificity (83.33% vs. 66.67%) and overall accuracy (94.34% vs. 88.00%). Positive predictive values were similarly high-97.83% for CT and 97.67% for USG. However, the negative predictive value was significantly better for CT (71.43%) than for USG (28.57%).

Table-I: Demographic Characteristics of the Study Patients (n=50)

Variable		Number of Patients	Percentage (%)
Age (in years)	26–29	3	6.0
	30–39	4	8.0
	40–49	7	14.0
	50–59	17	34.0
	60–69	13	26.0
	70–79	4	8.0
	80–85	2	4.0
	Mean±SD	**57.9 ± 17.8**	
	Range	**26–85**	
Sex	Male	33	66.0
	Female	17	34.0

Table- II: Clinical Features of the Study Patients (n=50)

Clinical Feature	Number of Patients	Percentage (%)
Anaemia	39	78.0
Nausea and anorexia	37	74.0
Weight loss	36	72.0
Abdominal pain	23	46.0
Jaundice	20	40.0
Ascites	12	24.0

Table -III: Distribution of Ultrasonography and Computed Tomography Variables in Hepatic Lesion Evaluation (n=50)

Variable		USG		CT	
		Frequency	(%)	Frequency	(%)
Margin of lesions	Well defined	36	72.0	38	76.0
	Ill defined	14	28.0	12	24.0
Number of lesions	Multiple	42	84.0	45	90.0
	Single	8	16.0	5	10.0
Distribution in lobes	Both lobes	34	68.0	34	68.0
	Single lobe	16	32.0	16	32.0

Table-IV: Comparison of Ultrasonography and Computed Tomography Diagnoses with Histopathological Findings in Hepatic Metastases from GIT Cancer (n=50)

Variable		Histopathology		Total
		Positive (n = 47)	Negative (n = 3)	
USG Diagnosis	Positive	42 (True Positive)	1 (False Positive)	43
	Negative	5 (True Positive)	2 (False Positive)	7
CT	Positive	45 (True Positive)	1 (False Positive)	46
	Negative	2 (False Negative)	2 (True Negative)	4

Table-V: Diagnostic Validity Parameters of Ultrasonography and Computed Tomography in the Evaluation of Hepatic Metastases from Gastrointestinal Tract Cancer (n=50)

Test of Validity	USG (%)	CT (%)
Sensitivity	89.36	95.74
Specificity	66.67	83.33
Accuracy	88.00	94.34
Positive Predictive Value	97.67	97.83
Negative Predictive Value	28.57	71.43

Discussion

The comparative effectiveness of ultrasonography (USG) and computed tomography (CT) was assessed for early detection of hepatic metastases in patients with suspected gastrointestinal tract (GIT) malignancies. Conducted over one year at a tertiary care center in Bangladesh, histopathological diagnosis served as the gold standard to evaluate and compare the diagnostic performance of both imaging modalities. Imaging features such as lesion margin, number, and lobar distribution were analyzed to provide insights into their relative strengths, especially in resource-limited settings where early and accurate detection is crucial for treatment planning and better prognosis.

The demographic profile of the study population revealed a male predominance (66%) and a higher incidence of hepatic metastases among middle-aged to older adults, with the majority of cases (60%) occurring in individuals aged 50-69 years. This pattern aligns with findings from Engstrand et al.[13], who reported a similar male predominance (~53%) and increased incidence of hepatic metastases in patients aged 50-70 years.

In our cohort, anemia was the most prevalent symptom (78%), followed by nausea and anorexia (74%), and weight loss (72%). Abdominal pain (46%), jaundice (40%), and ascites (24%) were also frequently observed. These findings concur with Stat Pearls (NCBI), which identifies weight loss, abdominal pain, ascites, jaundice, and fatigue as common manifestations of liver metastases, particularly from colorectal cancer[14].

Imaging findings demonstrated that most hepatic lesions were multiple and bilobar, with USG detecting multiple lesions in 84% and CT in 90%, and both modalities identifying bilobar involvement in 68% of cases. This pattern closely mirrors the observations of Khan et al.[15], who reported bilobar involvement in 77% of liver metastasis cases and a low incidence (~10%) of solitary lesions.

Comparison of diagnostic findings with histopathology revealed that CT outperformed USG, identifying 45 true positives, 1 false positive, and only 2 false negatives, versus USG's 42 true positives, 1 false positive, and 5 false negatives. These results corroborate Mahboobi et al.[16], who reported CT sensitivity of ~94.9%, specificity of 67.5%, positive predictive value of 74.4%, and negative predictive value of 93% for metastatic liver lesions. This concordance reinforces CT's diagnostic accuracy in detecting metastatic hepatic lesions in suspected GIT malignancy.

Diagnostic validity parameters further emphasized CT's superiority, with sensitivity of 95.74% and specificity of 83.33%, compared to USG's 89.36% sensitivity and 66.67% specificity. These findings align with Kinkel et al.[17], who found CT sensitivity of 72% and specificity of 85% for liver metastases detection. Accuracy was high for both modalities (CT 94.34%, USG 88.00%), with similarly high positive predictive values (>97%). However, CT's significantly higher negative predictive value (71.43% compared to 28.57%) indicates a better capability to exclude the presence of metastases. Collectively, these findings substantiate CT as the more reliable imaging modality for early detection of hepatic metastases in patients with suspected GIT malignancy.

Conclusion

Liver metastases are a common and critical factor in the management of gastrointestinal tract malignancies, making early detection essential for improving patient outcomes. In this study, computed computed tomography (CT) demonstrated

superior diagnostic accuracy compared to ultrasonography (USG) in detecting hepatic metastases. CT showed higher sensitivity, specificity, and better negative predictive value, providing more detailed information on lesion characteristics and segmental localization. Therefore, CT is a more reliable imaging modality than USG for early evaluation of hepatic metastases in suspected GIT cancer patients.

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PEDIATRIC GALLSTONES IN AN UNDERWEIGHT 8-YEAR-OLD WITHOUT CLASSICAL RISK FACTORS: A CASE REPORT

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ABSTRACT

Background: Gallstones are rare in children, with most cases linked to hemolytic disorders, obesity, certain medications, or congenital biliary anomalies. Presentation in an underweight child without known risk factors is unusual. **Case Presentation:** We report the case of an 8-year-old female weighing 15 kg who presented with abdominal pain. She had no history of hemolytic anemia, ceftriaxone use, or obesity. Laboratory tests revealed normal hemoglobin levels but low mean corpuscular volume (MCV) and mean corpuscular hemoglobin (MCH). Abdominal ultrasonography confirmed gallstones without biliary obstruction. She underwent successful management with complete symptom resolution. **Conclusion:** This case highlights that gallstones can occur even in malnourished pediatric patients without conventional risk factors, emphasizing the need for consideration in the differential diagnosis of abdominal pain in children.

Keywords: pediatric gallstones, cholelithiasis, underweight, microcytosis.

Date of submission: 17.12.2024

Date of acceptance after modification: 22.12.2024

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Citation: Pediatric Gallstones in An Underweight 8-year-old Without Classical Risk Factors: a Case Report.TMMC Journal 2025; 10(1):34-37.

Introduction

Cholelithiasis is uncommon in children, with an estimated prevalence of less than 1% in most pediatric populations[1]. The majority of cases are associated with hemolytic diseases, obesity, prolonged parenteral nutrition, ceftriaxone therapy, or congenital biliary anomalies[2]. In contrast, gallstones in otherwise healthy, underweight children without these risk factors are rare and warrant clinical attention.

The pathogenesis of gallstone formation in children without hemolysis or obesity is not fully understood. Nutritional deficiencies and altered bile composition may contribute to stone formation[3]. We report a case of an underweight 8-year-old girl with cholelithiasis, normal hemoglobin levels, and microcytic indices, without any history of hemolytic anemia, drug exposure, or structural anomalies.

Case Presentation

An 8-year-old female named Oishe Biswas weighing 15 kg (below the 5th percentile for age) presented with history of intermittent right upper quadrant abdominal pain for 6 months, occasionally associated with nausea. There was no history of jaundice, fever, fatty food intolerance, drug use (including ceftriaxone), blood transfusion, or family history of gallstones.

Physical examination revealed a thin, undernourished child in no acute distress. Abdominal examination was unremarkable except for mild right upper quadrant tenderness. There was no hepatosplenomegaly.

Laboratory findings showed:

- Hemoglobin: within normal range
- Mean corpuscular volume (MCV): decreased
- Mean corpuscular hemoglobin (MCH): decreased
- White cell count and platelet count: normal
- Total and direct bilirubin: normal
- Liver enzymes: normal
- Reticulocyte count: normal
- Lactate dehydrogenase (LDH): normal

Abdominal ultrasonography demonstrated single bright echogenic foci measuring 6.7mm within the gallbladder lumen with posterior acoustic shadowing, consistent with gallstones. The gallbladder wall thickness was normal, and there was no evidence of bile duct dilation.

Patient underwent laparoscopic cholecystectomy under general anesthesia. Three laparoscopic ports were placed-one umbilical port for the camera and two additional working ports in the right hypochondrium and epigastric region. The gallbladder was dissected from the liver bed using standard electrocautery technique after careful identification of the cystic duct and artery. The cystic duct and artery were clipped and divided, and the gallbladder was retrieved via the umbilical port. The procedure was uneventful with minimal blood loss The postoperative course was uneventful, and the patient remained symptom-free at follow-up after 1 month.

Discussion

Although gallstones are common in adults, pediatric cholelithiasis remains rare. The estimated prevalence in the general pediatric population ranges from 0.13% to 1.9%1,[4]. Recognized risk factors include hemolytic anemias, obesity, loss, total parenteral nutrition, certain drugs (especially ceftriaxone), and congenital biliary tract anomalies[2,5]

Our patient had none of the common risk factors. Interestingly, her blood indices revealed microcytosis and low MCH despite normal hemoglobin. This finding could suggest latent iron.

Figure 1: Preoperative photograph of patient

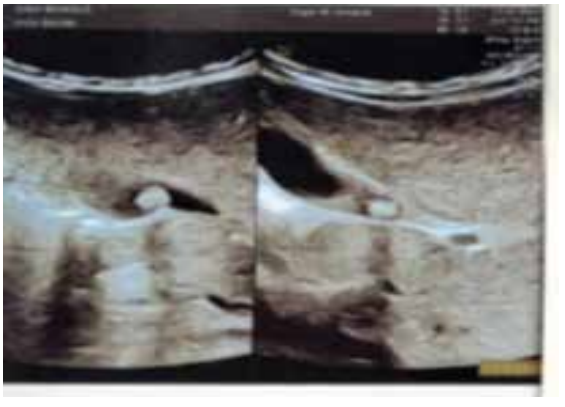

Figure 2: Abdominal ultrasonography showing gallstone within the gallbladder

Figure 3: Intraoperative laparoscopic view of the gallbladder during cholecystectomy

deficiency or thalassemia trait. While hemolytic anemia is a well-known cause of pigment gallstones, there is limited evidence on the role of microcytosis without hemolysis in gallstone formation[6]. She was also underweight, which raises interesting considerations. While obesity is a well-known risk factor for gallstone formation, some studies have reported gallstones in malnourished or low-BMI children In undernourished individuals, altered bile composition and impaired gallbladder motility may predispose to stone formation[7]. Furthermore, reduced dietary fat intake, common in malnutrition, can lead to bile stasis, increasing the risk for gallstone development[8].

Laparoscopic cholecystectomy remains the gold standard for symptomatic gallstones in children due to its safety, minimal invasiveness, and faster recovery. The standard three-port technique, as used in our patient, is widely practiced, although single-incision approaches have been explored in select cases. In children, special attention is required for port placement, lower insufflation pressures, and careful dissection to avoid bile duct injury.

This case underscores the importance of considering gallstones in the differential diagnosis of pediatric abdominal pain, even in underweight patients without classical risk factors.[9,10]. Early surgical intervention in symptomatic pediatric gallstones is associated with excellent outcomes, as delay may lead to complications such as acute cholecystitis, choledocholithiasis, or pancreatitis. The uneventful postoperative course in our patient highlights the safety and effectiveness of early laparoscopic management in appropriately selected cases[11].

Conclusion

Gallstones in children without hemolysis, obesity, or drug exposure are rare but possible. Microcytosis in the absence of anemia may be a subtle associated factor. Clinicians should maintain a high index of suspicion for gallstones in children presenting with unexplained abdominal pain, irrespective of body habitus.

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Types of Content

Submission of manuscripts are invited in the following areas:

Original Articles

It preferably describes new and carefully confirmed findings. It should not exceed 3,000 words, including all illustrations and references.

Review Article

It covers topics of health interest and up to date. It should be concise and no longer than 4,500 words, including all illustrations and references.

Short Communications

It records the result of complete small investigations or giving details of new models or hypothesis, innovative methods, techniques, images in clinical practice and prepared within 1700 words, plus up to ten references and two illustrations (tables and/or figures).

Case Report

It covers uncommon and / or interesting cases with appropriate information written within 2000 words, including references, one table and not more than two figures.

Letters to the Editor

Written with in 1000 words, including references and one table or one figure.

Reviewing Process and Actions

Manuscripts are usually examined by the editorial staffs and if necessary, it will be sent to outside reviewers. The submitting author is encouraged to suggest the name(s) of possible reviewers but the

editor reserves the right of final selection. Only one copy of the rejected manuscript will be returned, usually within six weeks of sybmission. Decision about potentially acceptable manuscript takes longer.

Permissions

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Ethical Aspects

Manuscripts based on human studies should be in accordance with ethical standards laid down in the Helsinki Declaration of 1975 revised in 2000.

In manuscripts, where human subjects are involved in studies, a paper describing that experimental works in man must indicate that informed consent has been obtained where appropriate and include a statement/ or attach copy of the approval by the Institutional Ethical Committee.

Organization of the Manuscript

Manuscript must be prepared in accordance with the guidelines laid down by the International Committee of Medical Journal Editors (www.icmje.org/index.html).

Text in double spaced throughout, justified and 2.5 margins on all sides. Body text typed in Times New Roman and Font size 12.

The submitting author must provide detail corresponding address with telephone and e-mail address. S(he) must disclose sources of funding or sponsor, number of tables and figures in the manuscript, word count and conflict of interest.

Cover letter

The submitted manuscript must be attached with a cover letter signed by all authors that declares originality of the data, confirmation of not submitted for consideration in any journal at home and abroad.

Title Page

The title page contains (i) title of the article which is conscise and informative; (ii) a short running title; (iii) List of Authors - name of each author is organized as first name, middle initial, and last name; (c) Author's affiliation - authors designation, name of department(s) and institutions(s) to which the work should be attributed; (iv) disclosure of source of funding; (v) number of tables and figures; (vi) total word count; (vii) conflict of interest; (ix) Detail address with telephone number and e-mail ID for correspondence about the manuscript.

Abstract Page

Abstract is given in a separate page within 250 words. The abstract should state the purposes of the study or investigation, basic procedures (selection of study subjects or laboratory animals; observational and analytical methods), main findings (specific data and their statistical significance, if possible), and the principal conclusions. New and important aspects of the study or observation should be emphasized. Abstract should contain no abbreviations.

Key Words: Five to ten key words should be provided at the bottom of the abstract.

Introduction

The introduction will acquaint the readers the purpose and rationale of the article. It should include neither result nor conclusions and strictly pertinent references.

Materials and Methods

The section should describe study design, place and period. Selection criteria of study population including controls (if any) must be mentioned clearly.

The methods and apparatus used in the study should be in sufficient details to allow other researchers to reproduce the results.

The drugs and chemicals used must be mentioned precisely including generic name, dose and route of administration.

Statistical procedure should be briefly and comprehensively addressed.

Results

The results should be presented in logical sequence in text tables, and illustrations. It is described without comment and supplemented by concise textual description of the data presented in tables and figures where it is necessary.

Tables

Each table should be typed in double spaced on a separate sheet and numbered in Roman letters (I, II, III, and IV etc). Table numbers appear consecutively in the order of their first citation in the text and supply a brief title for each. Do not submit tables as image. Any explanatory matter must be placed in footnote. Explain all the nonstandard abbreviations that are used in each table in the foot notes.

Identify statistical measures of variations such as standard deviation and standard error of the mean. Do not use internal horizontal and vertical rules.

The submission of extensive tabular material is discouraged.

Illustration

All illustrations must be numbered consecutively in Arabic numerals as cited in the text.

Print photograph of each illustration along with its electronic file should be submitted.

Figure number, title of manuscript, name of the corresponding author, and arrow indicating top should be written on a sticky label affixed on the back of each illustration.

Original drawings, graphs, charts and letterings should be prepared on an illustration board or high grade white drawing paper by an experienced medical illustrator.

Legend

Legends must be typed in a separate page. Photo micrograph should indicate the magnification internal scale and the method of staining

Discussion

The discussion section should reflect the comprehensive analysis of the results. Emphasis should be made on new and important aspects of the study and the conclusions derived thereof.

Repetition in detail data or other material given in the introduction or results section should be avoided.

Describe the implications of the findings and their limitations, including, implications for future research.

Relate the observations to other relevant studies.

Conclusion(s)

Conclusion must be linked with the goals of the study. Unqualified statement(s) and conclusion(s) which completely do not support the data must be avoided and in appropriate situation recommendation, if any, is encouraged.

Acknowledgement

Contributions that need acknowledgement but do not justify authorship should be specified.

Individuals' institution, sponsor, organization for technical help, financial and material support can be acknowledged.

References

Reference should be written in modified Vancouver style and should follow the ICMJE guidelines (http://www.icmje.org).

References should be numbered consecutively in the order in which they are first mentioned in text.

Names of 6 (six) authors must be given followed by et al if author number is more than six.

Example

Choudhury S, Chowdhury T. A Laparoscopic assessment of tubal functions in sulfentility. Bang J Obstet Gynaecol 1992; 17: 9-16.

Journal articles with organization as author World Health Organization. WHO laboratory manual for the examination and processing of human semen 5th ed. Geneva: World Health Organization Press 2010 P 17.

Standard Journal article on the Internet http://www.unicef.org/bangladesh /child and Maternal Nutrition %281%29.pdf accessed on 18th April 2014.

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