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Editorial

Elimination of Cervical Cancer in Bangladesh by 2030

Carcinoma cervix is the second most common cancer among women in Bangladesh. This is the third most common cancer among Asian women and the leading cause of cancer deaths in low- and middle-income countries. In Bangladesh, there were an estimated 9,640 new cases of cervical cancer in 2023, which resulted in an age-standardised incidence rate of 11.3 per 100,000 women.[1]

More than 90% carcinoma cervix are caused by Human Papilloma Virus (HPV), a sexually transmitted virus. There are over 100 subtypes of HPV, and a dozen of them are high oncogenic and responsible for cervical cancer.[2] The virus spreads through unsafe sex and multiple sex partners. Sexual exposure and first pregnancy at an early age, too frequent and too many childbirths, and sexually transmitted infections are important risk factors for carcinoma cervix. This cancer is mostly found among women of low socioeconomic status having malnutrition, poor genital hygiene and a weak immune system.

Cervical cancer usually develops slowly. It has a precancerous stage, which takes a long time (about 15-20 years) to become full-blown cancer. However, sometimes the process may be faster and take 5-10 years to develop into cancer. Thus, the disease has two peaks of age incidence – at around 35 years and about 50-55 years.

The good thing is this cancer is highly preventable. It can be prevented by eliminating the risk factors, screening, vaccination, and treating at the precancerous stage.

HPV Vaccine is the main tool to prevent cervical cancer. The bivalent vaccine (Cervarix, HPVax, Papilovax) works against two high oncogenic strains of HPV, whereas the quadrivalent vaccine (Gardasil) works against four strains of HPV. Both of them are available in Bangladesh. Vaccines are advised to take from 9 to 45 years of age. It is highly effective at a young age and a single dose can protect from carcinoma cervix. Initially, the World Health Organization (WHO) recommended two doses for young girls (9-14 years) and three doses for women above 14 years. Now the recommendation has changed to a single-dose HPV vaccine to protect against cervical cancer, especially the younger age group (9 to 14 years).

On the other hand, screening for cervical cancer can detect the disease at a premalignant stage. Pap test or Pap smear test is a widely accepted and previously named "gold standard" screening procedure. The U.S. Preventive Services Task Force (USPSTF) recommends screening for cervical cancer every 3 years with a Pap test in women ages 21-29 years. All other recommendations and guidelines recommend regular screening between the ages of 25 and 65 years at a 3-year interval. The WHO recommends VIA (visual inspection with acetic acid) as a screening procedure for low-resource settings. It is a simple but affordable screening test, which can be considered an alternative of Pap-test.[3] Bangladesh is adopting VIA as a screening test for cervical cancer. The national screening program for cervical cancer has been running in Bangladesh since 2004 through VIA. The major benefits of VIA are its

simplicity, low cost, and linkage with further investigations and treatment.[4,5] This screening program is delivered through the existing healthcare infrastructure in the country. It is done by trained nurses at all government medical colleges, some private medical colleges, district hospitals, maternal and child welfare centres (MCWCs), and selective Upazilla health complexes. The target population for VIA screening is apparently healthy, married women aged between 30 and 60 years. Screen positive and clinically unhealthy cases are referred to colposcopic examination, and if needed, colposcopy guided biopsy is taken from the cervix. The HPV DNA test is another screening test which is expensive but confirmatory for HPV infection. Most of the centres are adopting the "See and Treat" approach even at a very early premalignant stage during screening to reduce the dropout rate. This procedure skips the step of colposcopy and guided biopsy and minimizes the chance of attrition.[6]

The World Health Organisation (WHO) launched a Global strategy to accelerate the elimination of cervical cancer control by 2030. It can be achieved by implementing the triple intervention, ie. 90% girls to be vaccinated by the age 15 years, 70% women should be screened by 35 and again by 45 years and 90% women identified with cervical precancer should receive adequate treatment and care.[1] To fulfil the goal, awareness among people about its risk factors, screening and vaccines is important. Unfortunately, a huge population is unaware of the situation, especially in rural areas with lower levels of education. Even the decision makers of the family have a low level of knowledge about the risk factors. Girls are being married off at a young age, whereas sexually active before 18 years and becoming a mother during adolescence increase the likelihood of infection with the virus. Here public health campaigns can significantly contribute to improve the knowledge about the disease and to discourage early marriage.

Bangladesh has joined the global effort to eliminate cervical cancer by 2030 by strengthening HPV immunization programs. To ensure sustainability, it is being planned to integrate HPV vaccination into the routine immunization program for girls in grade five and for10 -year-old girls who are not enrolled in the education system. Apart from the governmental organisations, several non-governmental and voluntary organisations are working against cervical cancer.

The triple intervention, especially "See and Treat" approach in a low-resource setting, like ours, can help to reduce the incidence of cancer cervix. Thus, Bangladesh is hoping to be a cervical cancer-free country by 2030.

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Instruction for Authors:

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Each of the following section should begin on separate page-

- Title page
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May be structured with subheadings of Background Objective, Materials and Method, Results, Conclusion. Not mandatory for review articles and case reports.
Should not exceed 250 words.
Three to five keywords below the abstract may be used.

Text

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States the purpose of the article and summarizes the rational of the study.
Brief review of the subject.

Materials and Method

Should be very clear mentioning study design, place and period.
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J. Dhaka National Med. Coll. Hos. 2026; 32 (01): 07-11

ORIGINAL ARTICLE

Acute Acalculous Cholecystitis in Dengue Fever: An Emerging Clinical Entity

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Abstract

Background: Dengue fever is a mosquito-borne viral disease that presents with a wide range of clinical manifestations, varying from mild febrile illness to severe systemic involvement. Although acute acalculous cholecystitis is classically observed in critically ill patients, it has recently emerged as a notable complication associated with dengue infection.

Objective: This study aimed to determine the incidence, clinical characteristics, treatment approaches, and outcomes of patients with acute acalculous cholecystitis secondary to dengue fever.

Methods: A retrospective study was carried out in the Critical Care Unit of Dhaka National Medical College Hospital over a 24-month period (August 2023 to July 2025). A total of 222 patients diagnosed with dengue fever confirmed by positive dengue NS1 antigen or IgM antibody tests were included after requiring surgical consultation. Clinical records, laboratory findings, and abdominal ultrasonography reports were reviewed. Acute acalculous cholecystitis was identified based on clinical presentation and sonographic findings. Data were analyzed descriptively and presented in tables and figures.

Results: Among the 222 confirmed dengue cases, 62 patients (27.9%) developed acute acalculous cholecystitis. The cohort included 36 males and 26 females. The mean time from fever onset to hospital presentation was 3.7 days (range 3–5 days). The average white blood cell count was 4216 ± 1374.7 /cm and the mean platelet count was 23,757 ± 12,440.5 /cm. All patients presented with fever and headache (100%), while myalgia and arthralgia were observed in 90.5% and 89.2% respectively. Nausea and vomiting occurred in 87.8%, and abdominal pain was reported by 34.2%. Skin rash was noted in 11.7% of patients. Ultrasonography revealed gallbladder wall thickening in all 62 cases, pericholecystic fluid in 56 (25.2%), and a positive sonographic Murphy's sign in 51 (23.0%); no gallstones were detected. Mild to moderate ascites was present in 31 (14.0%) patients, hepatomegaly in 25 (11.3%), splenomegaly in 16 (7.2%), and mild pleural effusion in 24 (10.8%). The mean gallbladder wall thickness measured 6.1 ± 1.5 mm. All patients were successfully managed conservatively, without surgical intervention.

Conclusion: Acute acalculous cholecystitis represents an under-recognized but significant manifestation of dengue fever. Prompt ultrasonographic evaluation facilitates early detection, and conservative treatment strategies generally lead to favorable outcomes, thereby reducing unnecessary surgical procedures.

Keywords: dengue fever, acute acalculous cholecystitis, expanded dengue syndrome, gallbladder wall thickening, ultrasound, conservative management

Introduction

Dengue fever is an important vector-borne disease caused by the dengue virus, a single-stranded RNA virus belonging to the Flavivirus genus. Transmission occurs primarily through bites of infected female Aedes aegypti mosquitoes. The disease continues to pose a major public health concern across tropical and subtropical regions[1], particularly in South and Southeast Asia.[2]

In Bangladesh, dengue activity was first reported

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during the 1960s, when it was occasionally referred to as "Dacca fever."[3] For several decades that followed, reported infections were sporadic, and large outbreaks were uncommon. However, a major change occurred in 2000, when the country experienced its first large-scale dengue epidemic, resulting in more than 5,500 hospital admissions and 93 documented deaths, including cases of dengue hemorrhagic fever.[4] This event is often cited as a critical point marking the transition of dengue from a sporadic disease to a recurring national threat.[5]

Since that time, Bangladesh has faced almost annual dengue epidemics, characterized by increasing frequency, scale, and geographic distribution. The infection has now become endemic, with continuous background transmission and seasonal surges.[6] All four serotypes of the dengue virus (DENV-1 to DENV-4) are known to circulate in Bangladesh, though their predominance varies by period. Prior to 2016, DENV-1 and DENV-2 were most frequently detected, whereas DENV-3 has been increasingly dominant in recent major outbreaks.[7]

Epidemiological data demonstrate a sharp rise in disease burden over recent years. In 2018, more than 10,000 confirmed cases and 28 deaths were reported nationwide, followed by a large outbreak in 2019 involving over 81,000 cases and 67 fatalities.[8, 9] The situation worsened dramatically in 2023, when Bangladesh experienced its most severe dengue epidemic on record, with approximately 321,000 hospitalizations and 1,705 deaths by the end of the year.[10] The infection spread to all 64 administrative districts, including previously less-affected rural areas.

Clinically, dengue infection can range from asymptomatic or mild febrile illness to classical dengue fever, dengue hemorrhagic fever, dengue shock syndrome, or expanded dengue syndrome.[11] Typical features of classic dengue include abrupt high-grade fever, severe headache, retro-orbital pain, generalized body ache, nausea, vomiting, and joint pain.[12] Atypical manifestations involving the liver, central nervous system, heart, or gastrointestinal tract have also been described, including acute pancreatitis, myocarditis, encephalopathy, and fulminant hepatitis.[13]

One notable Hepato-biliary complication is acute acalculous cholecystitis (AAC) an inflammation of the gallbladder occurring in the absence of gallstones.[14] While AAC is classically associated with trauma, sepsis, or critical illness, it has increasingly been reported in dengue patients presenting with acute abdominal pain.[15] Such cases can resemble surgical emergencies such as acute appendicitis or perforated peptic ulcer, leading to diagnostic uncertainty.[16] Ultrasound findings commonly reveal gallbladder wall thickening, pericholecystic fluid, and sometimes hepatomegaly, splenomegaly, ascites, or right-sided pleural effusion.[16]

Given these observations, the present study was undertaken to determine the frequency of acute acalculous cholecystitis among dengue patients and to evaluate its diagnostic and prognostic implications.

Materials & Methods

A hospital-based retrospective study was conducted in the Critical Care Unit of Dhaka National Medical College Hospital over two years (from 1 August 2023 to 31 July 2025) following the acquisition of informed consent from all participants. A total of 222 patients admitted with a confirmed diagnosis of dengue fever were included in this study. Each patient underwent detailed clinical evaluation, physical examination, relevant laboratory investigations, and abdominal ultrasonography. All patients required surgical assessment during their course of hospital stay. Clinical investigation reports and ultrasonographic findings were carefully reviewed. Dengue fever was confirmed by either a positive NS1 antigen test or a positive IgM antibody result. Acute acalculous cholecystitis (AAC) was diagnosed based on characteristic clinical features in conjunction with ultrasonographic evidence. The clinical manifestations included fever, right upper-quadrant tenderness, and a positive Murphy's sign. Ultrasound findings considered diagnostic for AAC included gallbladder wall thickening greater than 3.5 mm, presence of a sonographic Murphy's sign (maximum tenderness over the sonographically localized gallbladder), pericholecystic fluid collection, and absence of gallstones. Patients with recent burns, abdominal trauma, vasculitis, or surgery were excluded from the study. Routine laboratory parameters such as alanine aminotransferase (ALT) levels and complete blood counts were assessed and repeated when clinically indicated. Hepatomegaly was defined as a right-lobe craniocaudal length (mid-clavicular line) exceeding 16 cm, while a splenic index greater than 20 cm^2 indicated splenomegaly. All participants received standard supportive management, including intravenous fluids, antibiotics, antipyretics, and

anti-ulcerant. Continuous monitoring of vital signs was maintained until complete clinical recovery. The collected data were entered into a digital database and statistically analyzed using SPSS software (version 20.1).

Results

Table-I: Clinical presentation of Dengue fever patients (n=222)

Presentation	Number of patients	Percentage (%)
Fever	222	100
Headache	222	100
Myalgia	201	90.54
Arthralgia	198	89.18
Nausea and Vomiting	195	87.83
Abdominal pain	76	34.23
Rashes	26	11.71
Bleeding manifestations	0	0

All patients presented with fever and headache (100%). Most of the patients had myalgia 90.54% and arthralgia 89.18%. Patients presented with nausea, vomiting was 87.83%. And abdominal pain was complained by 34.23% patients.

Table-II: Abdominal ultrasonographyfindings of Dengue patients (n=222)

Findings	Number of patients	Percentage (%)
Thick-walled gall bladder	62	27.92
Pericholecystic fluid collection	56	25.22
Sonographic Murphy's sign	51	22.97
Stone in the gall bladder	0	0
Ascites	31	13.96
Hepatomegaly	25	11.26
Pleural effusion	24	10.81
Splenomegaly	16	7.20

Gall bladder found thick walled in 62 (27.92%) patients. Pericholecystic fluid collected in 56 (25.22%) patients and sonographic Murphy's sign present in 51 (22.97%) patients. None of these 62 patients have gall stone.

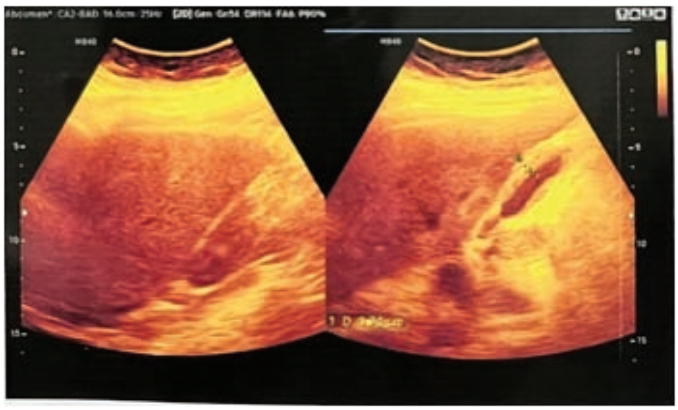

Figure-I: Ultrasonographic picture of increase wall thickness of gall bladder without stone in dengue patient

Discussion

The clinical presentation of dengue fever varies widely, ranging from simple febrile illness to severe hemorrhagic manifestations with or without shock. In the present study, all patients presented with fever and headache (100%), while myalgia (90.54%) and arthralgia (89.18%) were also common. Nausea and vomiting occurred in 87.83% of cases, and abdominal pain was reported by 34.23% of patients. Cutaneous rash was observed in 11.71% of the study population.

Acute acalculous cholecystitis (AAC) is increasingly recognized as a notable complication of dengue infection, particularly in endemic areas. The condition should be suspected when a dengue patient presents with right upper-quadrant pain, a positive Murphy's sign, mild transaminase elevation, and ultrasonographic evidence of gallbladder wall thickening. These findings are consistent with previous observations by Prasad et al. and Gulati et al.[19,20]

Although the precise pathogenesis of AAC in dengue remains uncertain, Shapiro et al. suggested that cholestasis, increased bile viscosity, and infection may contribute to its development.[21] However, the most widely accepted mechanism involves increased capillary permeability, leading to plasma leakage and serous effusion with a high protein concentration, primarily albumin.[22] Gallbladder wall thickening, therefore, is considered a surrogate marker of plasma leakage and has been shown to correlate with disease severity.[23]

In this study, out of 222 dengue patients, 27.92% were diagnosed with acute acalculous cholecystitis.

This incidence is higher than that reported by Wu et al., who observed AAC in 7.6% (10 out of 131) dengue cases,[24] and Khanna et al., who noted an incidence of 16.36% (9 out of 55 patients).[25] Among our AAC patients, 36 were male and 26 were female. The mean duration from onset of fever to hospital admission was 3.7 days (range 3–5 days). Mean white blood cell count was 4216 ± 1374.7/mm³, and mean platelet count was 23,757 ± 12,440.5/mm³ at presentation.

Laboratory profiles were consistent with typical dengue findings, including neutropenia, lymphocytosis, elevated hepatic transaminases, and thrombocytopenia.[26] Ultrasonography, as described by Wu et al.[27], often reveals gallbladder wall thickening, ascites, splenomegaly, and pleural effusion. In our series, all 62 patients with AAC demonstrated gallbladder wall thickening and pericholecystic fluid. Thirty-one patients had ascites, and twenty-four had minimal right-sided pleural effusion.

Management in all cases was conservative. Patients received intravenous fluids, antibiotics, antipyretics, and antiulcerant. As there was no bleeding manifestation, platelet transfusion was not required. None required surgical intervention, and all recovered without complications. These findings align with earlier institutional case series in which the mean gallbladder wall thickness was approximately 5.8 mm, and all patients improved with supportive management.[14] Other reports confirm that, with appropriate dengue-specific care, operative treatment is rarely necessary.[28]

Resolution of gallbladder wall thickening generally parallels the clinical recovery from dengue, and prognosis is excellent when the diagnosis is made early and treatment is supportive.[29] The primary diagnostic challenge lies in distinguishing dengue-associated AAC from other causes of acute abdomen. Misdiagnosis may lead to unnecessary surgical procedures, which carry additional risk in thrombocytopenic patients. Therefore, heightened clinical awareness, judicious ultrasonographic evaluation, and multidisciplinary management are crucial for optimal outcomes.

Conclusions

Acute acalculous cholecystitis is an under-recognized but clinically relevant complication of dengue fever. It should be suspected in patients with persistent right upper quadrant pain, thrombocytopenia, and ultrasound evidence of increased gall bladder wall thickness without gallstones. Conservative management is usually sufficient, with surgery reserved for complications. Early recognition prevents unnecessary operative procedures and improves outcomes in dengue patients.

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ORIGINAL ARTICLE

Severity and Types of Anemia in Female Patients: Experience from a Tertiary Care Hospital, Khulna

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Abstract

Background: Anemia remains a common hematological disorder among females, with diverse severity, morphology and underlying etiology. Understanding its distribution across age groups is essential for better clinical evaluation and management.

Objectives: To assess the severity, morphological patterns and etiological classification of anemia in non-pregnant female patients attending a tertiary care hospital.

Methods: This cross-sectional study was conducted in the department of Pathology, Gazi Medical College & Hospital, Khulna, including 248 anemic non-pregnant female patients fulfilling the inclusion criteria. Complete blood counts were performed using an automated hematology analyzer, while peripheral blood films aided morphological and etiological classification. Data were analyzed with SPSS version 26. Statistical associations were tested using chi-square analysis.

Results: The most affected age group was 18–40 years (47.6%). Moderate anemia was predominant across all age groups (59.3%), followed by mild (32.2%) and severe anemia (8.5%). Morphologically, normocytic normochromic anemia (NNA) was the most frequent type (64.9%), followed by microcytic hypochromic anemia (26.2%) and macrocytic anemia (8.9%). Etiologically, unclassified NNA was most common (42.3%), while iron deficiency anemia (IDA) accounted for 22.2%. Statistically significant associations were observed between anemia severity and both morphological types ($p<0.005$) and etiological classifications ($p<0.001$) respectively.

Conclusion: Moderate anemia and normocytic normochromic pattern were predominant among non-pregnant females, with unclassified NNA and iron deficiency anemia being the leading etiological types. These findings highlight the need for thorough diagnostic evaluation to identify underlying causes and guide appropriate management strategies.

Keywords: Anemia, Female patients, Iron deficiency, Morphology, Etiology

Introduction

Anemia is the most common haematological disorder all over the world.[1] According to World Health Organization (WHO), the prevalence of anemia is 30.7% among women of reproductive age globally.[2] It represents a major healthcare burden in developing countries like Bangladesh.[3] In Bangladesh, anemia affects 46% in pregnant women and 33% in non-pregnant women.[4] The burden is considerably higher due to nutritional deficiencies, menstrual blood loss, repeated pregnancies and poor socioeconomic status.[5] There is significant association of anemia with morbidity and mortality of a patient as well.[6]

Anemia encompasses a broad range of multiple aetiologies, including nutritional deficiencies (iron, folate, vitamin B12), chronic blood loss, systemic illnesses, bone marrow suppression, parasitic infestation and hereditary disorders such as thalassemia. This broad etiological spectrum highlights the importance of morphological classification to guide further evaluation and management.[7]

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Morphologically anemia can be classified based on the size and hemoglobin content of red blood cells. They are divided into normocytic, microcytic and macrocytic anemias depending on size and normochromic or hypochromic anemias based on hemoglobinization levels.[8] Morphological classification of anemia by PBF examination can provide insight into the underlying etiologies such as iron deficiency, vitamin B12/folate deficiency or chronic disease to a greater extent.[9]

As recent studies suggest that causes of anemia are complex and context specific. Efforts are needed to better understand how the principal causes of anemia—including iron deficiency, other micronutrient deficiencies, chronic disease and hemoglobin disorders—contribute to its burden, so that appropriate and targeted interventions can be implemented in specific settings.[10]

There are several methods by which anemia can be detected and classification of anemia can be established. Complete blood count (CBC) generated by haematology auto analyzer and microscopic examination of peripheral blood film (PBF) of blood slide are among them.[11]

In Bangladesh, anemia among women remains a major public health issue.[4] Khulna, being one of the major divisions of southern region of Bangladesh, has a diverse population with significant rural communities where nutritional deficiencies and limited access to health care contribute to higher anemia burden.[12] Females, particularly adolescents and women of reproductive age, are disproportionately affected by anemia due to increased physiological demands, menstrual blood loss, nutritional deficiencies, repeated pregnancy, absence of deworming interventions and ignorance about sanitation.[13]

By focusing on this group, the study aimed to reflect the severity and different types of anemia among women in this region. The findings will help in planning targeted interventions such as nutrition programs, iron supplementation and health education.

Materials and Methods

This cross-sectional study was conducted in the Department of Pathology, Gazi Medical College Hospital (GMCH), Khulna from March to July, 2025. During this study period 248 female anemic patients requested for CBC investigation and met the sample acceptance criteria according to standard operating procedure (SOP) in GMCH, Khulna were enrolled by purposive sampling. All laboratory investigations were carried in the department of pathology, GMCH.

Patient selection

Inclusion criteria

All the nonpregnant female patients from 18 years onward, diagnosed with anemia according to 'WHO guideline to define anemia: 2024' were included in the study.[14]

Exclusion criteria

Inadequate amounts of blood samples, clotted specimens, hemolyzed specimens or specimens with wrong vacutainer were excluded.

Laboratory procedure

Test procedure

Complete blood count

Hematological parameters were carried out by SYSMEX Automated Hematology Analyzer (Model: XN-550). The hemoglobin concentration (Hb%), red cell distribution width (RDW), red blood cell (RBC) indices including mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were obtained.

Microscopic examination of peripheral blood film

Microscopic examination of all peripheral blood film (PBF) slides (stained with Leishman stain) was done.

Ethical consideration

Prior to the commencement of this study, the research protocol was approved by the Ethical Institutional Review Board (IRB) of Gazi Medical College, Khulna. Informed consent was taken from the study participants. All information collected was kept confidential.

Statistical Analysis

All statistical computations were performed by window-based computer software devised with Statistical Packages for Social Sciences (IBM SPSS Statistics 26 version). The results were presented with tables and bars, where applicable. Pearson Chi-square test was performed to analyze the association between the types of anemia and its severity. For all statistical tests we considered p value <0.05 as statistically significant.

Results

This cross-sectional study was carried out in the department of Pathology in Gazi Medical College & Hospital, Khulna. A total of 248 anemic non-pregnant female patients were enrolled in this study according to the inclusion criteria.

Figure-1 presented the age group distribution of anemic patients. According to age, the most common affected age group was between 18-40 years in our study with 47.6% cases.

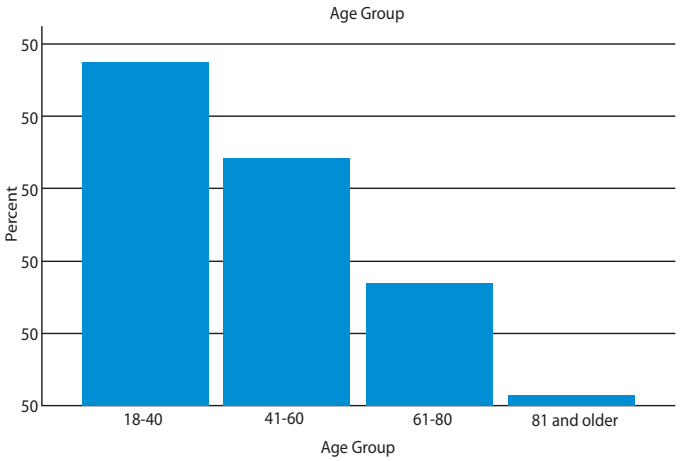

Fig-1: Distribution of Anemia According to Age Group (n=248).

Moderate anemia was most prevalent (59.3%) in all the age groups compared to mild and severe anemia.

Table-I: Distribution of severity of anemia according to Age Groups (n=248)

Age in years	Anemia Severity (%)		
	Mild	Moderate	Severe
18-40	41 (34.7)	69 (58.5)	08 (6.8)
41-60	27 (31.8)	50 (58.8)	08 (9.4)
61-80	12 (28.6)	25 (59.5)	05 (11.9)
81 and older	0 (0)	03 (100)	0 (0)
Total	**80 (32.2)**	**147 (59.3)**	**21 (8.5)**

PBF examination stated that the predominant morphological type of anemia was normocytic normochromic anemia (NNA), followed by microcytic hypochromic anemia (MHA) in Table-II.

Table-II: Morphological typesof anemia in different age group of patients (n=248)

Age in years	MA n (%)	MHA n (%)	NNA n (%)
18-40	7 (5.9)	35 (29.7)	76 (64.4)
41-60	4 (4.7)	20 (23.5)	60 (71.8)
61-80	10 (23.8)	10 (23.8)	22 (52.4)
81 and older	1 (33.3)	0 (0)	2 (66.7)
Total	**22 (8.9)**	**65 (26.2)**	**161 (64.9)**

Age in (years)	ACD n (%)	IDA n (%)	NNA (unclassified) n (%)
18–40	9 (7.6)	32 (27.1)	59 (50.0)
41–60	26 (30.6)	15 (17.6)	30 (35.3)
61–80	7 (16.7)	8 (19.0)	14 (33.3)
≥81	0 (0.0)	0 (0.0)	2 (66.7)
Total	**42 (16.9)**	**55 (22.2)**	**105 (42.3)**

(MA=Macrocytic anemia; MHA=Microcytic hypochromic anemia; NNA=Normocytic normochromic anemia)

Table-III showed that normocytic normochromic anemia (unclassified) was 105 (42.3%). Iron deficiency anemia (IDA) was 55 (22.2%) among microcytic hypochromic anemia.

Table-III: Aetiological classification of anemia based on peripheral blood film examination (n=248)

Age in (years)	ACD n (%)	IDA n (%)	NNA (unclassified) n (%)
18–40	9 (7.6)	32 (27.1)	59 (50.0)
41–60	26 (30.6)	15 (17.6)	30 (35.3)
61–80	7 (16.7)	8 (19.0)	14 (33.3)
≥81	0 (0.0)	0 (0.0)	2 (66.7)
Total	**42 (16.9)**	**55 (22.2)**	**105 (42.3)**

Age (years)	CDA n (%)	HA n (%)	MA n (%)	Thalassemia n (%)
18–40	5 (4.2)	3 (2.5)	7 (5.9)	3 (2.5)
41–60	2 (2.4)	6 (7.1)	4 (4.7)	2 (2.4)
61–80	1 (2.4)	2 (4.8)	10 (23.8)	0 (0.0)
≥81	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)
Total	**8 (3.2)**	**11 (4.4)**	**22 (8.9)**	**5 (2.0)**

(ACD = Anemia of chronic disorder; IDA = Iron deficiency anemia; NNA = Normocytic normochromic anemia; CDA = Combined deficiency anemia; HA = Hemolytic anemia; MA = Macrocytic anemia)

In table-IV association of morphological types of anemia and severity of anemia of the patients was analysed which was statistically significant (p<0.05).

Table-IV: Association of morphological types of anemia and severity of anemia of the patients (n=248)

Types of anemia	Mild	Moderate	Severe	Chi-sq	P-value
NNA	61	91	9		
MHA	10	46	9	14.682	0.005
MA	09	10	3		

(NNA=Normocytic normochromic anemia; MHA=Microcytic hypochromic anemia; MA=Macrocytic anemia)

In table-V association of aetiological types of anemia and severity of anemia of the patients was analysed which was statistically significant (P<0.05).

Table-V: Association of aetiological types of anemia (based on PBF examination) and severity of anemia of the patients (n=248)

Aetiological Types	Mild	Moderate	Severe	Chi-sq	P-value
ACD	7	33	2		
CDA	1	6	1		
HA	0	5	6	78.1	0.0
IDA	6	42	7	88	00
MA	9	10	3		
NNA (Unclassified)	55	49	1		
Thalassemia	2	2	1		

(ACD = Anemia of chronic disorder; CDA = Combined deficiency anemia; HA= Hemolytic anemia; IDA= Iron deficiency anemia; MA= Macrocytic anemia; NNA = Normocytic normochromic anemia)

Discussion

The present study was conducted to determine the severity and types of anemia among female non-pregnant patients in Khulna. Among 248 patients the majority of cases lie between the age group 18-40 years which was118 (47.6%) in numbers. This result is consistent with the studies of Sagar K D et al and Ramya G et al.[8,15]

In terms of severity, the present study demonstrated that the majority of patients were classified as having moderate anemia (59.3%) followed by mild cases (32.2%), while severe anemia (8.5%) constituted the lesser proportion. This pattern is comparable to the findings of Agarwal et al., Thyagaraju et al., Ramya G et al., Singh A B et al. and Krishnan G et al., who also reported moderate anemia as the most common category among their study populations.[1,6,15.,17,18] Conversely, Burdak et al. and Fardous F et al. reported that mild anemia was predominant in their studies.[10,13] On the other hand in the study of Beyene W et al., severe anemia was the major type of anemia.[19] Variations across these studies may therefore be attributed to differences in socioeconomic conditions, dietary practices, burden of chronic diseases and availability of healthcare services.[20] Overall, the predominance of moderate anemia in our study highlights the importance of early detection and timely intervention to prevent progression to severe, life-threatening anemia.

In the present study, peripheral blood film examination revealed that the predominant morphological type of anemia across all age groups was normocytic normochromic anemia (NNA), accounting for 161 (64.9%) cases. This was followed by microcytic hypochromic anemia (MHA) in 65 (26.2%) cases and macrocytic anemia (MA) in 22 (8.9%) cases. Similar findings were reported by Agarwal et al., and Thyagaraju et al. where NNA was the most prevalent morphological pattern (57.26%) and (54.4%) respectively.[1,6] In contrast, studies by Krishnan et al., Beyene et al. and Pandey B et al. reported MHA as the most common morphological pattern, followed by NNA.[18,19,21]Such variation in the distribution of anemia types across different populations may be attributed to differences in study settings, underlying etiologies, sample size variation.[22]

The aetiological classification of anemia based on peripheral blood film (PBF) examination revealed that the most common type was normocytic normochromic anemia (NNA) in 105 (42.3%) cases. Normocytic normochromic anemia (NNA) may arise from widely varying etiologies, including chronic inflammatory disorders, bone marrow failure, chronic kidney disease and others.[9] In the present study, however, the causes underlying NNA were not specifically investigated and confirmed and therefore this category was reported as unclassified. Findings from Agarwal et al. and Thyagaraju et al. similarly reported NNA as the predominant etiological category of anemia.[1, 6] Among microcytic hypochromic anemia iron deficiency anemia (IDA) was the most common subtype which was

present in 55 (22.2%) cases. These findings were in accordance with the studies of Fardaus et al., Ramya G et al., and Krishnan et al.[13,15,18]

Although microcytic hypochromic anemia may also arise from thalassemia, anemia of chronic disease and sideroblastic anemia, iron deficiency remains the leading cause in the most populations.[16] This high prevalence of IDA can be attributed to poor dietary intake, increased physiological demands during pregnancy and lactation, and pathological chronic blood loss, particularly menstrual blood loss among women of reproductive age.[12,16] In our study the patients of anemia of chronic disorder (ACD) were in 42 (16.9%) cases. Notably, some patients diagnosed with early-stage of ACD presented morphologically as NNA, whereas others exhibited microcytic hypochromic features. Macrocytic anemia (MA) was observed in 22 (8.9) cases, hemolytic anemia (HA) in 11 (4.4%) cases, combined deficiency anemia (CDA) in 8 (3.2%) cases and thalassemia in 5(2%) cases as well.

The present study found a statistically significant association between the morphological types of anemia and its severity among the patients ($\chi^2 = 14.682$, $p = 0.005$). Normocytic normochromic anemia (NNA) was the most frequent type observed across all grades of severity, being predominant in both mild (61 cases) and moderate anemia (91 cases) which were in accordance with the studies of Bhadran et al. and Krishnan R. et al.[23,24]

The relatively high occurrence of MHA in moderate and severe categories is consistent with nutritional deficiencies, especially iron deficiency, which is common in developing regions.[8,19] The low prevalence of MA in this study population aligns with global patterns where megaloblastic anemia contributes to a smaller proportion of cases.[9]

In the present study, a statistically significant association was found between the etiological types of anemia and the severity of anemia among the patients ($\chi^2 = 78.188$, $p<0.001$). Normocytic normochromic anemia (NNA) was most frequent in mild anemia (55 cases) and remained high in moderate cases (49), but decreased sharply in severe anemia (1 case). The predominance of NNA in moderate anemia, may reflect underlying chronic diseases, renal disorders or marrow suppression.[9] Iron deficiency anemia (IDA) was concentrated in moderate anemia (42 cases) and contributed substantially to severe anemia (7 cases) which was also found in hemolytic anemia (6 cases). These findings are consistent with the studies of Burdak et al., Bhadran et al. and Krishnan R. et al[8, 23,24]

In conclusion, the findings of our study highlight the importance of considering the association of anemia not only with severity but also with its morphological and etiological patterns, as these reflect the underlying causes and can guide more targeted interventions.

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Conflict of interest

None declared.

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ORIGINAL ARTICLE

Patterns of Antimicrobial Resistance and Molecular Detection of ipaH ShigellaStrains in Diarrhoeal Children in Sylhet

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Abstract:

Background: Despite the efforts of SDG and MDGs, diarrhoea remains a leading cause of morbidity and mortality among children under five.

Aim: The present study aimed to observe the antimicrobial susceptibility patterns and molecular detection of ipaH producing Shigella species from under 5 children with diarrhoea.

Methods: This cross-sectional observational study was carried out from July 1, 2021, to June 30, 2022, in the Department of Microbiology in collaboration with the Department of Paediatrics at Sylhet MAG Osmani Medical College Hospital, Sylhet. The target population comprised all children with diarrhoea admitted to the Inpatient Department of Paediatrics. 98 sample were selected based on inclusion and exclusion criteria and data were collected by a pre-designed questionnaire. Stool samples were collected promptly upon admission or prior to the commencement of any antibiotic therapy. The specimens underwent culture, Gram staining, and biochemical tests to identify Shigella species, followed by antimicrobial susceptibility testing and molecular analysis (PCR) for the ipaH gene.

Result: The mean age of 2.84 ± 2.45 years with 56.1% male children. Shigella species were isolated from 13 cases (13.3%). All Shigella spp isolates produced ipaH gene. Shigella was found maximum in bloody diarrhoea (40.0%) (p=0.003). Out of 13 isolates all (100.0%) were sensitive to cefixime, ciprofloxacin and cefepime; 92.3% were sensitive to cefuroxime, ceftriaxone and mecillinam; 84.6% to azithromycin and amoxicillin-clavulanic acid; 38.5% to nalidixic acid; 30.8% to tetracycline and ampicillin and 23.1% to trimethoprime-sulfamethoxazole.

Conclusion: Diverse antibiotic susceptibility pattern of Shigella spp., was observed in the study sample.

Keywords: antimicrobial resistant, bloody diarrhea, ipaHShigella

Introduction

Diarrhoea remains a leading cause of morbidity and mortality among children. Globally, diarrhoea accounts for nearly 1.7 billion cases annually, resulting in over 525,000 deaths in children under five.[1] In Bangladesh, diarrhoea prevalence among children is 6.9%,[2] with bacterial pathogens, particularly Shigella species, being significant contributors. Annually, an estimated 80-165 million shigellosis cases occur globally, resulting in 600,000 deaths.[3] InBangladesh, Shigella is endemic, causing up to 300,000 cases yearly and contributing to 20% of diarrhoea-related deaths among children.[4]

Shigella species invade intestinal cells through virulence factors such as invasion plasmid antigen H (ipaH). ipaH is present in multiple copies on both the plasmid and chromosome of Shigella species.[5] Major manifestations of shigellosis is diarrhoea, which may be bloody, mucoid or watery, and is associated with fever and abdominal pain.

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The emergence of multidrug-resistant (MDR) Shigella strains has complicated treatment, with reported resistance against ciprofloxacin and azithromycin.[6] At present, the first line recommended agents for treating shigellosis are ciprofloxacin or azithromycin, however a study conducted in Bangladesh revealed that rise in resistant strains of Shigella towards ciprofloxacin from 0% in 2004 to 44% in 2010.[7]

Molecular detection methods, particularly polymerase chain reaction (PCR), provide high sensitivity and specificity for identifying ipaH-producing Shigella. Such techniques can enhance diagnostic accuracy and enable timely administration of appropriate antibiotics, especially in MDR cases. This study aimed to determine the antimicrobial susceptibility patterns and detect ipaH-producing Shigella in stool samples from children with diarrhoea in Sylhet, Bangladesh.

Methodology

This cross-sectional observational study was conducted for 1 year, in the Department of Microbiology in collaboration with the Department of Paediatrics at Sylhet MAG Osmani Medical College Hospital, Sylhet; after obtaining ethical permission from Ethical Committee of Sylhet MAG Osmani Medical College Hospital. The selected population included all diarrhoeal children admitted to the Inpatient Department of Paediatrics, excluding those attending the outpatient department. Children aged below six months or who had received antibiotics within the previous week were excluded from the study.

A non-probability convenient sampling technique was employed to recruit participants. Patients fulfilling the eligibility criteria were identified from the paediatric inpatient department. After obtaining informed written consent from the guardians, stool samples were collected immediately after admission or before initiating any antibiotic therapy. Samples were collected in sterile, disposable containers without preservatives and transported promptly to the Department of Microbiology. In the laboratory, the specimens underwent culture, Gram staining, and biochemical tests to identify Shigella species, followed by antimicrobial susceptibility testing and molecular analysis for the ipaH gene.

Molecular detection of the ipaH gene was performed using polymerase chain reaction (PCR) techniques. Initially, plasmid DNA was extracted from the isolates using the Monarch plasmid DNA purification kit (New England Biolabs, USA) according to the manufacturer's guidelines. The extracted DNA served as a template for thermal cycling to amplify the target ipaH gene using a PCR mixture comprising a master mix, forward and reverse primers specific to the gene, and the template DNA. Visualization of the amplified gene product was carried out using a Digi gel documentation system. For the PCR assay, a total reaction volume of 50 µl was prepared in sterile micro-centrifuge tubes. Agarose gel electrophoresis was used to analyze the PCR products.

All collected data were processed and analyzed with the help of SPSS (Statistical Package for Social Science) version 26. Continuous variables were summarized using means and standard deviation in case on normally distributed data, or, when data is not be normally distributed. And categorical variables were summarized using frequency distributions. Difference between groups were analyzed using chi-square test for categorical variables. A p-value of less than 0.05 was considered to constitute a statistically significant difference.

Result

Table-1 described that about 52.0% of the participants were aged between 1 to 5 years, 32.6% were between 6 months and 1 year, and15.3% were above 5 years, with a mean age of 2.84 ± 2.45 years. Male children accounted for 56.1%, while female children comprised 43.9%, resulting in a male-to-female ratio of 1.28:1. Most of the participants (63.3%) belonged to the lower socioeconomic class, followed by 35.7% from the middle class and only 1.0% from the upper class, indicating a higher prevalence of cases among children from economically disadvantaged backgrounds.

Table-1: Distribution of the participants according to sociodemographic characteristics (n=98)

Variables	Frequency	Percentage (%)
Age		
6 months-<1 year	32	32.6
1-5 years	51	52.0
>5 years	15	15.3
mean ± SD	2.84 ± 2.45	
Sex		
Female	43	43.9
Male	55	56.1
Socioeconomic status		
Lower class	62	63.3
Middle class	35	35.7
Upper class	1	1.0

Out of 98 stool samples, 13 (13.3%) were positive for both Shigella spp. and the ipaH gene, while the remaining 85 (86.7%) samples tested negative (figure-1).

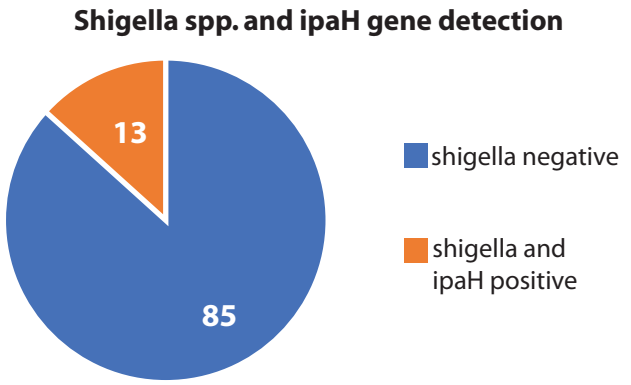

Figure-1: Distribution of the participants according to Shigella spp. and ipaH gene detection (n=98)

Shigella was most frequently detected in cases of bloody diarrhoea, with 40.0% of samples testing positive, compared to 13.3% in mucoid diarrhoea and 5.7% in watery diarrhoea. The difference in detection rates among diarrhoeal types was statistically significant (p=0.003) (table-2).

Table-2: Association of isolated Shigella (ipaH positive) with types of diarrhea

Diarrhoeal type	Shigella		p-value
	Positive and ipaH positive	Negative	
Mucoid diarrhoea (n=30)	4 (13.3%)	26 (86.7%)	
Watery diarrhoea (n=53)	3 (5.7%)	50 (94.3%)	ap=0.003s
Bloody diarrhoea (n=15)	6 (40.0%)	9 (60.0%)	
Total	**13**	**85**	

a= chi square test

s= statistical significance

Figure-2 described antibiotic susceptibility pattern of Shigella species showed high resistance to tetracycline, nalidixic acid, ampicillin, and trimethoprim-sulfamethoxazole, with resistance rates of 69.2%, 61.5%, 69.2%, and 76.9%, respectively. In contrast, high sensitivity was observed for ciprofloxacin, cefixime, ceftriaxone, cefepime, and mecillinam, with sensitivity rates exceeding 92.3%. Moderate resistance was noted for azithromycin and amoxicillin-clavulanic acid.

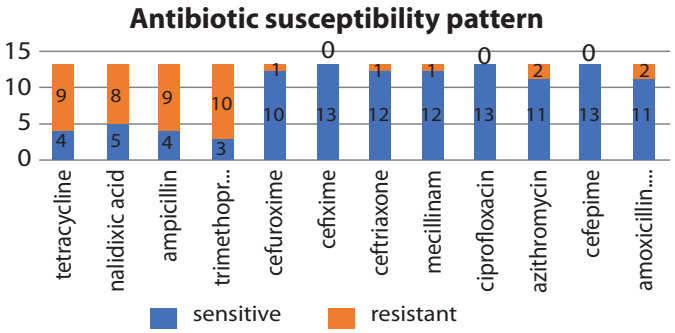

Figure-2: Antimicrobial susceptibility pattern of Shigella spp. isolated from diarrhoeal children (n=13)

Discussion:

The age of participants in this study had a mean age of 2.84 ± 2.45 years. Comparable findings were reported by Assefa and Girma, Gebreegziabher et al., Jomezadeh et al. and Kahsay et al.[8-10] Male children accounted for 56.1% of the participants in this study, with a male-to-female ratio of 1.28:1. This aligns with findings by a couple of articles[9,11,12] who reported male predominance also.

Regarding the type of diarrhoea, watery diarrhoea was most common (54.1%), followed by mucoid and bloody diarrhea. Similar trends were reported where watery diarrhoea accounted for 62.7%, mucoid 29.2%, bloody 4.6%, and mixed 3.5%, highlighting potential geographic variations in strain distribution.[9] In the present study, 13 (13.3%) were positive for Shigella spp., consistent with findings by Kahsay et al. (13.3%),[10] Sheikh et al. (13.2%),[13] Debas et al. (14.9%),[14] Mekonnen et al. (14.6%),[15] and Huruy et al. (16.9%).[16] Lower detection rates were reported by a couple of studies (6.9% and 7.1%),[9,17] while higher rates were observed in studies by Mache et al. (20.1%)[18] and Jafari-Sales and Shariat (26.17%).[12]

All 13 isolates of Shigella spp. in this study were positive for the ipaH gene, a finding corroborated by studies in Iran[13] and Bangladesh.[4] A multicenter study in six Asian countries reported ipaH gene detection in 90% of 427 Shigellaculture-positive specimens.[19]

Cefixime, an orally administered third-generation cephalosporin, is considered effective for outpatient treatment. High sensitivity rates of Shigella spp. to cefixime were reported, even 100% in some studies[20] including in Bangladesh,[21] while Jafari-Sales and Shariat observed a lower sensitivity rate of 72.6%.[12] Fluoroquinolones, particularly ciprofloxacin, are preferred for empirical treatment of acute diarrhea in adults due to their broad efficacy and favorable safety profile. This study and others, reported 100% sensitivity of Shigella spp. to ciprofloxacin.[9] However, Jafari-Sales and Shariat observed a reduced sensitivity rate of 75%,[12]

Cefuroxime demonstrated 92.3% sensitivity in this study, though comparable studies are limited. Similarly, ceftriaxone, another third-generation cephalosporin, showed 92.3% sensitivity in this study, aligning with findings of 98–100% sensitivity by a couple of studies.[9,21] Sensitivity to cefepime was universal (100%) in this study. Mecillinam showed 92.3% sensitivity, consistent with the 97% sensitivity reported by Rahman et al. (2007).[21] Sensitivity to azithromycin and amoxicillin-clavulanic acid was observed at 84.6% in this study, with Rahman et al. reporting slightly higher rates for both drugs (84% and 100%, respectively).[21]

Resistance to tetracycline was high (69.2%), corroborating similar findings by Jafari-Sales and Shariat (67.9%)[12] and Gebreegziabher et al. (77.8%).[9] Ampicillin resistance was also substantial (69.2%), with higher resistance rates reported by Abebe et al. (76.5%)[22] and Gebreegziabher et al. (88.9%).[9] Similarly, trimethoprim-sulfamethoxazole resistance was 76.8%, aligning with findings by Abebe et al. (64.7%)[22] and Jafari-Sales and Shariat (92.8%).[12] Nalidixic acid resistance was notable at 61.5%, comparable to other original articles.[22]

Conclusion:

Shigellosis was significantly associated with bloody diarrhoea, predominantly affecting children under five years from lower socioeconomic backgrounds. PCR demonstrated high sensitivity in detecting Shigella spp., which exhibited resistance to trimethoprim-s ulfamethoxazole, ampicillin, tetracycline, and nalidixic acid but remained highly sensitive to ciprofloxacin, cefixime, cefepime, and ceftriaxone.

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ORIGINAL ARTICLE

A Study on the Use of Autologous Venous Blood for the Management of Alveolar Osteitis

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Abstract:

Objectives: Alveolar Osteitis (AO), commonly known as dry socket, is a painful postoperative complication of tooth extraction. Conventional management is largely palliative. This research was aimed to evaluate the efficacy of autologous venous blood (AVB) placed in the socket as a biologically based method for pain control and enhanced healing in AO.

Materials and Methods: A prospective, comparative, non-randomised interventional research was conducted on 100 patients diagnosed with AO. Subjects were alternately allocated into two groups: the test group (n = 50), treated with autologous venous blood, and the control group (n = 50), managed with zinc oxide eugenol (ZOE) dressing. Pain intensity was assessed using the Visual Analogue Scale (VAS) on days 0, 1, 3, and 7, while clinical healing was evaluated at follow-up visits. Data were analyzed using SPSS software (version 22), and a p-value of less than 0.05 was considered statistically significant (two-tailed test).

Results: The baseline demographic and clinical parameters showed no significant differences between the study groups. By day 3, the AVB group demonstrated significantly greater pain reduction than the ZOE group (mean VAS 2.1 vs 4.6, $p < 0.05$). By day 7, clinical healing scores were significantly superior in the AVB group ($p < 0.05$). No adverse effects were recorded, and patient satisfaction was higher in the AVB group.

Conclusions: Autologous venous blood is a simple, cost-effective, and biologically sound method for managing alveolar osteitis. It provides superior pain relief and enhanced healing compared with conventional ZOE dressing, without observed complications.

Keywords: alveolar osteitis, dry socket, autologous blood, socket healing, third molar extraction

Introduction

Alveolar osteitis (AO), also known as dry socket or fibrinolytic alveolitis, represents one of the most common postoperative complications following tooth extraction. Its incidence ranges from approximately 1–5% in routine extractions and may increase to as high as 38% in mandibular third molar surgeries.[1] The condition is typically characterized by intense pain, loss or dissolution of the blood clot, and delayed socket healing, usually manifesting within 1 to 3 days after extraction.[2,3]

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The pathogenesis of AO is attributed to localised fibrinolysis, where plasmin-mediated dissolution of the clot exposes underlying bone.[4] Both intrinsic and extrinsic factors contribute, including surgical trauma, bacterial toxins, and host response.[5,6] Identified risk factors include traumatic extraction, smoking, poor oral hygiene, pre-existing infection, oral contraceptive use, hormonal fluctuations, systemic comorbidities, and advanced age.[7-9] In addition, microbial colonisation by species such as Prevotella and Fusobacterium is strongly implicated.[9]

Management of AO is largely palliative. Conventional treatments include socket irrigation followed by obtundent dressings such as zinc oxide eugenol (ZOE),[10] Alvogyl,[11] SaliCept patch,[12] and GECB pastilles.[12]

Adjunctive therapies such as low-level laser application,[14] platelet-rich fibrin (PRF),[15] and natural agents including Nigella sativa oil[16] and vitamin C[17] have also been studied. While these modalities provide symptomatic relief, limitations include variable effectiveness, expense, or the need for specialised equipment.

Autologous venous blood (AVB), by contrast, is readily available, cost-effective, and inherently biocompatible. It promotes rapid natural clot formation, provides growth factors, reduces nociceptor stimulation, and offers antimicrobial protection via leukocytes.[18] Unlike platelet concentrates such as PRF or PRP, its use requires no centrifugation or specialised infrastructure, making it suitable for routine clinical settings.

This study was undertaken to evaluate the efficacy of AVB application in the management of AO, with emphasis on pain reduction, clinical healing, and patient satisfaction.

Materials and Methods

Study Design and Setting:

A prospective, comparative study was conducted between January 2024 and December 2024 across five centers in Dhaka, Bangladesh: the Departments of Oral and Maxillofacial Surgery, Bangladesh Medical University (BMU), Dhaka Dental College & Hospital; BIRDEM General Hospital, Dhaka National Medical College & Hospital & Armed Forces Medical Institute (AFMI).

The study adhered to the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants prior to inclusion. Formal ethical approval was not required, as the procedure utilized autologous blood and did not introduce any additional risk to the patients.

Sample Size and Eligibility Criteria

A total of 100 patients diagnosed with alveolar osteitis were included.

Inclusion criteria: Age 18–60 years, diagnosis of AO based on Blum's criteria,[3] and provision of informed consent.

Exclusion criteria: Systemic illness affecting healing, bleeding disorders, immunocompromised status, or history of clotting abnormalities.

Group Allocation and Interventions

Participants were alternately assigned into two groups (n = 50 each):

Test Group (AVB): Following socket irrigation, 2–3 mL of autologous venous blood was drawn under aseptic conditions and placed into the socket. A sterile gauze or periodontal dressing (e.g. Coe-Pak) was applied to retain the clot.

Control Group (ZOE): After socket irrigation, a zinc oxide eugenol dressing was placed into the socket.

Postoperative Care

Both groups received standard post-extraction instructions, including avoidance of vigorous rinsing, smoking cessation, and maintenance of oral hygiene.

Outcome Measures

Pain assessment: Pain intensity was recorded using the Visual Analogue Scale (VAS) on days 0, 1, 3, and 7.

Healing Assessment

Clinical evaluation of socket healing was performed at follow-up visits.

Adverse Events: Any complications or side effects were documented.

Statistical Analysis

Data were analysed using SPSS version 22. Continuous variables were expressed as mean ± SD, and categorical variables as frequencies and percentages. Intergroup comparisons were performed using the independent samples t-test and chi-square test, with statistical significance set at $p < 0.05$ (two-tailed).

Results

Baseline Characteristics:

A total of 100 patients clinically diagnosed with alveolar osteitis were enrolled in the study. The baseline demographic and clinical variables were similar across both groups, with no statistically significant differences observed. The age-wise distribution of the cases is presented in Table-1.

Table-1: Distribution of cases with age range

Age range	No of involved cases	Percentage (%)
18-30	15	15
31-40	23	23
41-50	25	25
51-60	37	37

Most patients (37%) were in the 51–60 years age group, while the lowest representation (15%) was from the 18–30 years group. The majority of AO cases followed extraction of mandibular third molars (60%), as summarized in Table-2.

Table-2: Frequency of involvement of extracted tooth with dry socket

Frequency of involvement of tooth extracted	No of cases	Percentage (%)
Mandibular wisdom teeth	60	60%
Mandibular teeth other than 3rd molars	30	30%
Maxillary teeth	10	10%

Gender Distribution

Figure-1 illustrates the gender distribution of the study population. Females were more frequently affected than males.

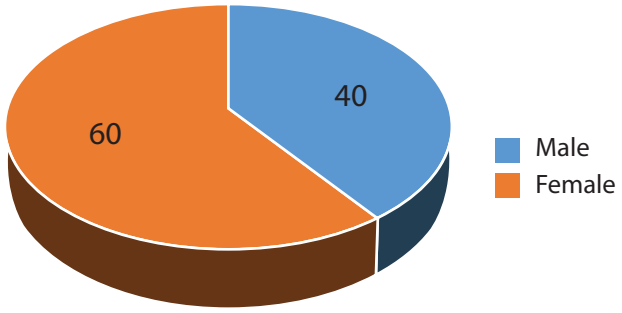

Figure-1: Pie chart represents the percentage (%) of male and female affected dry socket.

Pain Scores

Pain intensity, as measured by the Visual Analogue Scale (VAS), decreased in both groups over time, but the reduction was significantly greater in the AVB group. By day 3, mean VAS was 2.1 in the AVB group compared with 4.6 in the ZOE group ($p < 0.05$). The trend is presented in Figure-2.

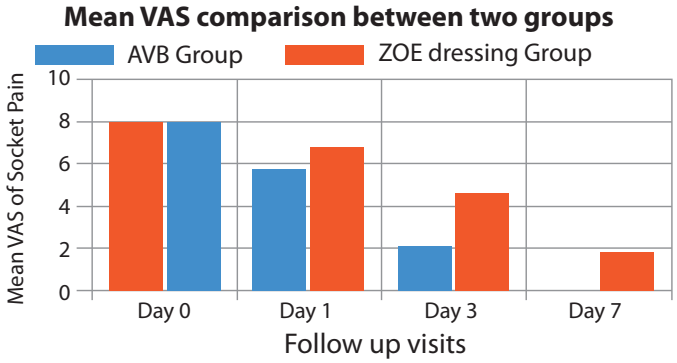

Figure-2: Comparisonof mean VAS values between two groups at different follow up intervals

Figure-2: Bar chart showing comparison of mean VAS values between two groups across different follow up visits (Day 0, Day 1, Day 3 and Day 7). A p-value of < 0.05 was considered statistically significant.

Healing Outcomes

By day 7, the AVB group demonstrated significantly improved clinical healing compared with the ZOE group ($p < 0.05$). Patients in the AVB group also reported higher overall satisfaction.

Adverse Effects

No complications or adverse reactions were recorded in either group during the follow-up period.

Discussion

Alveolar osteitis (AO) remains one of the most painful and distressing complications following tooth extraction, with a multifactorial aetiology and a variable reported incidence.[1-3] Its clinical impact is considerable, leading to prolonged pain, delayed healing, and reduced patient satisfaction. The present study demonstrates that the application of autologous venous blood (AVB) is a simple, effective, and biologically sound approach to AO management, providing superior pain control and improved healing compared with conventional zinc oxide eugenol (ZOE) dressings.

Conventional obtundent dressings such as ZOE and Alvogyl have been widely used owing to their analgesic and antibacterial properties.[10-12] However, their limitations include unpleasant taste, potential local reactions, risk of hypersensitivity to eugenol, and incomplete or delayed healing.[20,21] Other adjunctive methods, including the SaliCept patch, GECB pastilles, low-level laser therapy, and pharmacological interventions, have produced variable results.[13–15,24] Platelet-rich derivatives such as PRF and PRP have shown promising outcomes in socket healing,[16,19,27] but they require additional equipment, laboratory processing, and incur higher costs, making them less feasible in routine clinical practice.

In contrast, AVB offers several biological advantages. It facilitates rapid natural clot formation, providing immediate coverage of exposed alveolar bone and reducing stimulation of nociceptors, which accounts for the significant reduction in pain observed in this study.[3,18] Moreover, blood-derived growth factors such as PDGF, VEGF, and TGF-β enhance angiogenesis and tissue repair, while leukocytes confer antimicrobial protection, reducing the risk of secondary infection.[25,26] These mechanisms explain the superior healing and higher patient satisfaction observed in the AVB group compared with the ZOE group.

Our findings are consistent with recent evidence supporting biologically based interventions for AO.[16,19,27] Compared with PRF or PRP, AVB is cost-effective, time-efficient, and easily applicable in outpatient clinical settings. Importantly, no adverse effects were reported, underscoring its safety.

The limitations of the present study include its non-randomized design, relatively small sample size, and lack of histopathological evaluation of the healing process. To confirm these results and establish standardized guidelines for the clinical application of autologous venous blood (AVB), larger multicenter randomized controlled trials with extended follow-up periods are warranted.

Conclusion

Autologous venous blood (AVB) is a promising, biologically sound, and cost-effective approach for the management of alveolar osteitis. Compared with conventional zinc oxide eugenol dressings, AVB provided superior pain relief, enhanced socket healing, and improved patient satisfaction, without associated complications. Its simplicity and applicability in routine dental practice make it an effective alternative for managing this common postoperative complication. Further multicenter randomised trials are recommended to establish its role as a standard treatment modality.

Conflict of Interest

The authors declare that there are no conflicts of interest related to this study.

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ORIGINAL ARTICLE

Operative Stabilization of Pelvic Ring Injuries and Risk of Urinary Complications: A Comparative Analysis

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Abstract:

Objectives: Pelvic ring injuries, typically from high-energy trauma like road accidents or falls, often damage nearby urogenital structures. Standard treatment involves operative stabilisation, including external fixation, open reduction and internal fixation (ORIF), or combined surgical approaches for effective management.This study aimed to evaluate the incidence, types, and risk factors of urinary complications in patients undergoing operative stabilisation of pelvic ring injuries and to compare outcomes according to fracture severity and surgical method.

Methods: This comparative observational study included 30 adult patients with radiologically confirmed pelvic ring injuries who underwent operative stabilisation at Dhaka National Medical College, Dhaka, Bangladesh, from January 2014 to July 2024. Patients aged ≥18 years requiring surgical fixation for acute pelvic ring disruptions, classified according to the Tile/AO system, were included. Data were entered and analysed using SPSS version 26.0.

Result: Among 30 patients with operatively stabilised pelvic ring injuries, most were males (73.3%) with high-energy trauma, and Type C fractures predominated (56.7%). ORIF was the most common surgical method (53.3%), followed by combined fixation and external fixation in both (23.3%). Urinary complications occurred in 18.9% of patients, mainly urinary retention (13.2%) and hematuria (10.0%), with higher rates in Type C fractures and more extensive surgical approaches.

Conclusion: This study showed that urinary complications remain a significant concern after operative stabilisation of pelvic ring injuries. Among 30 patients, postoperative issues such as hematuria, urinary retention, and catheter-related infections were more common in unstable fractures and in those requiring combined anterior–posterior fixation.

Keywords: Operative Stabilisation, Pelvic Ring Injuries, Urinary Complications

Introduction

Pelvic ring injuries often result from high-energy trauma and can compromise the integrity of the bony pelvis, potentially injuring adjacent urogenital organs because of their close anatomical relationship to the pelvic ring.[1] In fact, the disruption of the pelvic ring - especially with pubic symphysis diastasis or displaced pubic rami - has been associated with damage to the bladder, urethra, or both.[2] Such lower urinary tract injuries (LUTIs) occur in a negligible proportion of patients with pelvic fractures; a pooled analysis estimated the overall incidence at around 6.9%.[3] Beyond the acute injury, long-term urogenital sequelae (such as urinary incontinence, urethral stricture, and sexual dysfunction) contribute substantially to morbidity and impaired quality of life among survivors of pelvic fractures with urogenital injury.[4] Importantly, the pattern and severity of pelvic ring disruption strongly influence the risk of urogenital injury: fractures involving the anterior pelvis, pubic diastasis, or displaced rami are particularly dangerous.[2,5] Operative stabilisation- using open reduction and internal fixation (ORIF), external fixation, or percutaneous fixation

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- remains the mainstay for unstable or displaced pelvic ring injuries, aiming to restore structural stability, control haemorrhage, allow mobilisation, and reduce mortality from hemodynamic instability.[6] However, surgical intervention itself may influence urogenital outcomes. The act of reduction and fixation may re-approximate or compress pelvic bones around previously injured bladder or urethra (or bone fragments), potentially exacerbating or unmasking urinary tract injury. This risk underscores the need for a careful urologic evaluation in patients undergoing operative fixation of pelvic injuries.[7] Evidence on postoperative complications after pelvic fracture surgery shows a substantial overall complication rate. In a 2022 cohort of 233 patients who underwent operative treatment (ring or acetabular fractures), 24% had complications; surgical-site infection (SSI) was the most common (15%), followed by implant/material problems and neurologic injuries.[6] Another study with a 5-year follow-up of 194 surgically treated pelvic fractures found a 25% rate of unplanned reoperations, 9.3% due to infection, and 18% had nerve injuries - underlining that morbidity after pelvic surgery is not trivial.[8] Despite the growing body of literature on orthopaedic complications, urogenital complications following operative fixation have received comparatively less attention. A retrospective study of 186 patients with pelvic ring fractures reported urinary complications in about 8.1% of cases (major), with bladder rupture in 5.7%, posterior urethral rupture in 4.8%, urinary retention, hematuria, or oliguria in others.[2] There are also case reports illustrating severe urologic outcomes following displaced bone fragments - for example, a detached pubic bone fragment migrating into the urinary bladder in a patient with pelvic fracture, requiring surgical removal.[9] Moreover, a review of urogenital disorders after pelvic ring injuries concluded that rupture of the pubic symphysis (or major symphyseal diastasis) is the most important risk factor for urogenital injury; and that outcomes such as urinary incontinence and sexual dysfunction are common in both men and women after pelvic trauma, underscoring the prognostic importance of early detection and multidisciplinary urologic–orthopaedic cooperation.[5] This study aimed to evaluate the incidence, types, and risk factors of urinary complications in patients undergoing operative stabilisation of pelvic ring injuries and to compare outcomes according to fracture severity and surgical method.

Methods

This comparative observational study included 30 adult patients with radiologically confirmed pelvic ring injuries who underwent operative stabilisation at Dhaka National Medical College, Dhaka, Bangladesh, from January 2014 to July 2024. Ethical approval was obtained from the institutional review board, and informed consent was secured from all participants. Patients aged ≥18 years requiring surgical fixation for acute pelvic ring disruptions, classified according to the Tile/AO system, were included, while those with hemodynamic instability precluding surgery, pre-existing urinary tract pathology, open contaminated pelvic fractures, pregnancy, or non-operative management were excluded. Demographic characteristics, mechanism of injury, fracture type, associated injuries, and operative details (approach, fixation type, operative time, and blood loss) were recorded. Preoperative imaging and selective genitourinary evaluation were performed based on clinical suspicion. Postoperative urinary complications, including hematuria, urinary retention, catheter-associated infections, and urethral or bladder injuries, were monitored. Data were entered and analysed using SPSS version 26.0. Categorical variables were summarised as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation. Comparative analysis between groups (fracture type, surgical approach) was performed using Chi-square for categorical variables and independent-sample t-test for continuous variables. A p-value <0.05 was considered statistically significant.

Results

The cohort consisted predominantly of young to middle-aged males with high-energy mechanisms of injury. Type C injuries were more frequent than Type B. [Table-I]

Table-I: Baseline Demographic and Clinical Characteristics (N = 30)

Variables	Frequency (%) / Mean ± SD
Age (years), mean ± SD	36.9 ± 11.8
Sex (Male)	22 (73.3)
Sex (Female)	8 (26.7)
Mechanism of Injury	
– Road-traffic collision	18 (60.0)
– Fall from height	6 (20.0)
– Crush injury	6 (20.0)
Tile Classification	
– Type B (rotationally unstable)	13 (43.3)
– Type C (rotationally & vertically unstable)	17 (56.7)
Associated injuries	12 (40.0)

More than half underwent definitive ORIF, while one-fourth required combined approaches. Most patients received delayed fixation consistent with prior trauma protocols [Table-II].

Table-II: Type of Operative Stabilisation and Timing of Surgery

Variables	Frequency (%)
Type of Surgery	
– External Fixation Only	7 (23.3)
– ORIF (Anterior/Posterior)	16 (53.3)
– Combined (External + ORIF/ Percutaneous)	7 (23.3)
Timing of Surgery	
– Early fixation (<72 hours)	12 (40.0)
– Delayed fixation (>72 hours)	18 (60.0)
Mean operative time (minutes)	121.6 ± 26.4

The overall urinary complication rate was 20.0%, similar to what has been reported in earlier pelvic ring injury literature (8-22%). Urinary retention and hematuria were the most frequent postoperative issues [Table-III].

Table-III: Incidence and Types of Urinary Complications

Urinary Complications	Frequency (%)
Any urinary complication	6 (20.0)
Bladder injury (pre-existing or detected during surgery)	2 (6.7)
Urethral injury/stricture	2 (6.7)
Urinary retention	4 (13.3)
Hematuria (post-operative)	3 (10.0)
Catheter-associated UTI	3 (10.0)
Need for secondary urologic procedure	2 (6.7)

Urinary complications occurred more frequently in Type C injuries (23.5%) than in Type B injuries (15.4%), although the difference was not statistically significant. The trend mirrors prior studies showing higher urogenital injury risk in more unstable fracture patterns [Table-IV].

Table-IV: Urinary Complication Rates by Tile Classification

Tile Classification	Total Patients (n)	Patients With Urinary Complications n (%)	Patients Without Complications n (%)	p-value
Type B	13	2 (15.4)	11 (84.6)	
Type C	17	4 (23.5)	13 (76.5)	0.28
Total	**30**	**6 (20.0)**	**24 (80.0)**	

Patients undergoing combined fixation (28.6%) and ORIF (18.8%) had higher urinary complication rates than those treated with external fixation alone. Although not statistically significant, this pattern reflects the greater severity and complexity typically associated with these surgical methods [Table V].

Table-V Urinary Complication Rates by Surgical Method

Surgical Method	Total Patients (n)	Complications n (%)	No Complications n (%)	p-value
External Fixation Only	7	1 (14.3)	6 (85.7)	
ORIF (Anterior/Posterior)	16	3 (18.8)	13 (81.2)	0.45
Combined (External + ORIF/Percutaneous)	7	2 (28.6)	5 (71.4)	
Total	**30**	**6 (20.0)**	**24 (80.0)**	

Age >40 years and operative time >120 minutes were significantly associated with postoperative urinary complications. Tile type, sex, and timing of surgery showed no significant associations but demonstrated clinically relevant trends [Table-VI].

Table-VI: Factors Associated with Urinary Complications (Bivariate Analysis)

Factor	Complication Present (n=6)	Complication Absent (n=24)	p-value
Age > 40 years	2	4	0.04*
Male Sex	3	9	0.58
Tile Type C	2	8	0.30
Associated Injuries Present	2	5	0.10
Delayed Surgery (>72 h)	3	8	0.34
Operative time > 120 min	2	4	0.05*

*Statistically significant at $p < 0.05$

Discussion

In this cohort of 30 operatively stabilised pelvic ring injuries, the overall rate of urinary complications was 20.0% (6/30). This rate is higher than some large registry estimates but consistent with several institutional series that report important urogenital morbidity after pelvic trauma. Alwaal et al. reviewed pelvic-fracture–related lower urinary tract injuries and reported variable incidences across series, noting pooled estimates in the single-digit to low-teens depending on case selection and diagnostic vigilance.[10] Sun et al., in a multicentre series of 924 pelvic fractures, found urethral injuries in 2.6% overall but emphasised that reported rates rise when studies focus on high-energy and unstable fracture patterns.[11] Our 20.0% figure, therefore, likely reflects the operative cohort's greater fracture severity

(43% Type B, 57% Type C) and the inclusion of both bladder and other urinary complications (retention, hematuria, catheter-associated UTI), not only frank urethral disruption. We observed bladder injury and urethral injury/stricture remain same in 6.7% (2/30). Alfayez et al. documented a striking case of an intravesical bone fragment after pelvic fracture and highlighted that bladder rupture rates in series range widely (commonly up to 5-10% in selected trauma populations).[9] Blaschko and colleagues' systematic review of pelvic-fracture urethral injury (PFUI) emphasised that PFUI incidence across reports varies (often 1.5-10%) and that such injuries carry a high burden of long-term sequelae, including stricture and erectile dysfunction.[12] Our urethral injury frequency sits within the upper range of these published values, again aligning with the fact that an operatively managed sample concentrates more unstable, displaced injuries. When stratified by fracture severity, Type C fractures had a higher complication rate (23.5%) than Type B (15.4%). This gradient accords with prior work showing that more severe pelvic disruption correlates with greater genitourinary injury risk: Alwaal et al. and other investigators reported that anterior disruptions and symphyseal diastasis, often seen in unstable patterns, portend higher bladder and urethral injury rates.[10,13]

Similarly, Henstenburg et al. identified fracture severity and concomitant abdominal injuries as important predictors of postoperative complications following pelvic fixation.[14] Comparing complication frequency by surgical method, patients treated with ORIF (18.8%) and combined approaches (28.6%) experienced more urinary problems than those treated with external fixation alone (14.3%). Lundin et al., in a five-year follow-up of surgically managed pelvic fractures, reported higher overall complication and reoperation rates after more extensive open procedures, with infection and nerve injury predominating, and they noted that more invasive approaches are commonly used for the most displaced fractures.[8] Miskimins et al. similarly observed that extending abdominal incisions or performing open anterior approaches increases local soft-tissue morbidity.[15]

Limitations of the Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion

This study showed that urinary complications remain a significant concern after operative stabilisation of pelvic ring injuries. Among 30 patients, postoperative issues such as hematuria, urinary retention, and catheter-related infections were more common in unstable fractures and in those requiring combined anterior–posterior fixation.

Recommendation

Based on the study findings, it is recommended that all patients undergoing operative stabilisation for pelvic ring injuries receive routine pre- and postoperative genitourinary evaluation, especially those with unstable fracture patterns. A coordinated approach involving trauma surgeons, orthopaedic surgeons, and urologists should be implemented to identify and manage urinary complications early.

Declaration

This is to declare that the manuscript titled "Operative Stabilization of Pelvic Ring Injuries and Risk of Urinary Complications: A Comparative Analysis" is an original work and has not been published or submitted elsewhere for publication. All authors have significantly contributed to the study and approved the final version of the manuscript.

Ethical approval was obtained from the Institutional Review Board of Dhaka National Medical College, Dhaka, and informed written consent was taken from all participants. The study was conducted in accordance with standard ethical guidelines.

The authors declare that there is no conflict of interest and no financial support was received for this study.

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33Appendix:

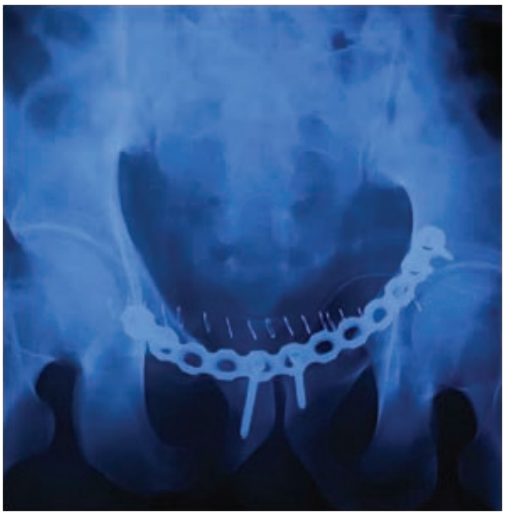

Figure: Post-operative X-ray

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CASE REPORT

When Chordoma Isn't Chordoma: Lessons from a Misleading Diagnosis

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Abstract:

Primary bone malignancies are exceptionally rare, and sacral tumors often pose significant diagnostic challenges because of their insidious presentation and overlapping radiological features. Chordoma is the most common malignant tumor of the sacrum, while solitary plasmacytoma of bone (SPB) is much rarer and even less frequently considered in Asian populations. We report the case of a 50-year-old man who presented with a one-year history of progressive low back pain, without neurological deficit or systemic features. Initial imaging demonstrated a destructive lytic lesion of the sacrum with an associated soft tissue mass, radiologically suggestive of chordoma. Fine-needle aspiration cytology was inconclusive and yielded conflicting impressions, including Ewing's sarcoma and chordoma. Definitive biopsy, however, revealed sheets of plasmacytoid cells with Russell bodies and amyloid deposits, establishing the diagnosis of plasmacytoma. This case highlights the diagnostic dilemma posed by solitary sacral lesions and emphasizes the importance of histopathological confirmation, as management of plasmacytoma differs substantially from that of chordoma. Recognition of this rare entity is crucial to avoid unnecessary surgical morbidity, since radiotherapy remains the cornerstone of treatment for sacral plasmacytoma.

Keyword: Chordoma, Plasmacytoma, Primary bone malignancies, Solitary sacral lesions

Introduction

Primary bone malignancies are rare, accounting for only about 0.2% of all cancers.[1] Among these, chordoma represents a small subset, comprising approximately 2–4% of primary bone tumors,[2] with an annual incidence of 0.8 cases per million population.[3] Nearly half of all chordomas arise in the sacral or coccygeal region.[4] An even rarer entity of axial skeleton malignancies is solitary plasmacytoma of bone (SPB), with an estimated incidence of 3.5 per million population.[5] While data on Western populations are available, reports from Asian cohorts are limited; one Taiwanese study noted that SPB accounted for 6.2% of all plasma cell neoplasms.[6] Both chordoma and SPB are indolent but destructive tumors of the sacrum. They usually progress insidiously, producing vague symptoms that can delay recognition until significant local destruction or neurological compromise has occurred.[7,8] This overlap in clinical and radiological features makes distinction between the two particularly challenging. Here, we report a rare case of a sacral lesion that was initially suspected to be chordoma but was ultimately confirmed to be plasmacytoma, highlighting the importance of careful diagnostic evaluation in such complex presentations.

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Case history

A 50-years male presented to the Department of Orthopaedics at Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, in February 2023, with a history of persistent low back pain. The discomfort had been dull, aching, and localized to the sacral region, gradually increasing in intensity over the preceding year. He reported increasing difficulty in carrying out his daily activities, such as prolonged standing, bending, or lifting, and noted occasional disturbance of sleep due to nocturnal discomfort.

Clinical examination revealed localized pain elicited during the straight leg raising test; without radiation. However, motor and sensory functions of the lower limbs remained intact, reflexes remained intact and there was no disturbance of bowel or bladder control. There were no clinical signs of radiculopathy, and systemic evaluation did not reveal features of anemia, hypercalcemia, or renal dysfunction.

The insidious onset of pain without neurological deficit initiated the first diagnostic confusion.The patient's hematological profile revealed mild anemia (Hb 8.6 g/dL) and a raised ESR (40 mm in the first hour), while serum calcium, urea, creatinine, and eGFR levels remained within normal limits. The albumin-to-globulin ratio was preserved, and protein electrophoresis demonstrated a polyclonal gammopathy. Serum immunoglobulin levels (IgA, IgM, IgG) were normal, and β2-microglobulin was 2 mg/dL. To exclude multiple myeloma, a skeletal survey was performed, which did not reveal any additional punched-out lytic lesions. Bone marrow examination was normal, and no paraproteinemia or end-organ damage was evident.

Plain radiography (X-ray, Fig. 1) showed a destructive lytic lesion involving the sacrum. The lesion appeared as an area of bone rarefaction with poorly defined margins and cortical thinning, suggestive of an aggressive process. There was evidence of trabecular bone destruction with absence of sclerosis, consistent with a malignant pathology. The lesion expanded the sacral contour but did not show calcification or periosteal reaction, features that may help differentiate from other primary bone tumors.

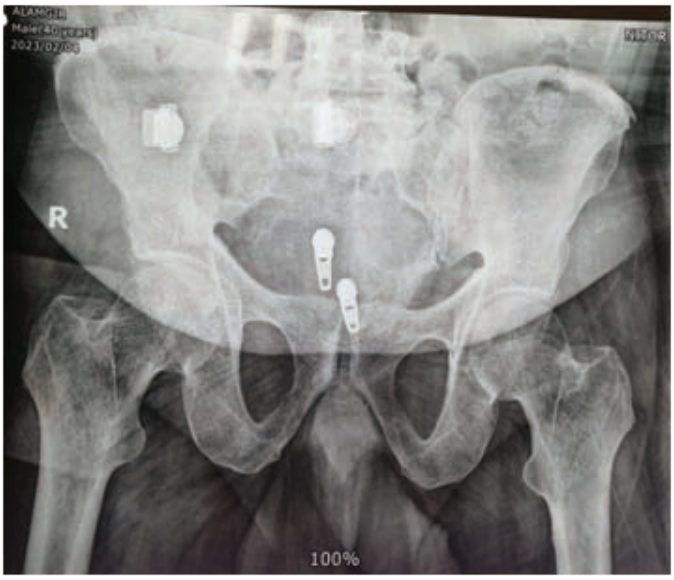
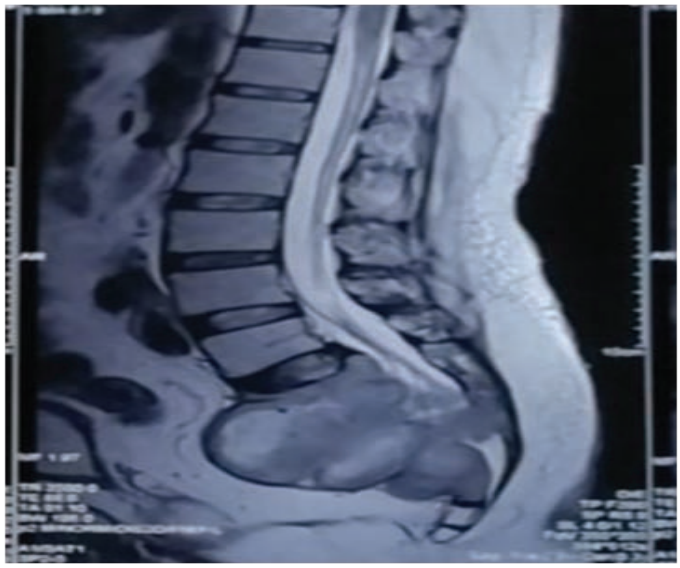


Figure-1: Lytic lesion of sacrum on plain x-ray

Magnetic resonance imaging (MRI, Fig. 2) revealed a large, lobulated soft tissue mass arising from the sacrum, measuring approximately 11 × 9 × 7.6 cm. The lesion caused destruction of all sacral vertebrae and extended into the presacral space. On T1-weighted imaging, the lesion was predominantly hypointense, while on T2-weighted imaging, it demonstrated a hyperintense signal. Post-contrast sequences showed strong, heterogeneous enhancement, reflecting its vascular nature and cellular density. The tumor encroached upon adjacent pelvic soft tissues, although without definitive invasion of bowel or bladder structures. These imaging features were strongly suggestive of a malignant sacral tumor, with chordoma initially favored in the differential diagnosis.



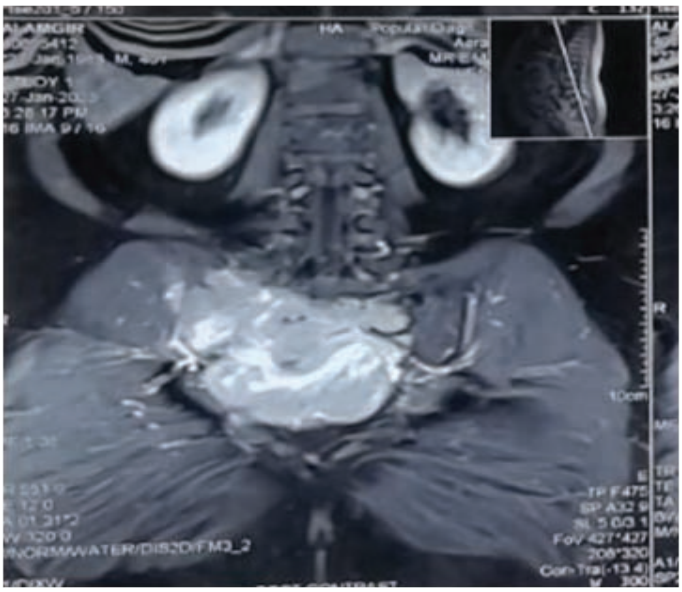


Figure-2: MRI showing large lobulated soft tissue lesion with bony destruction of all sacral vertebrae

CT-guided fine-needle aspiration cytology (FNAC) report was inconclusive. One cytology report suggested malignant cells consistent with Ewing's sarcoma, while another indicated features compatible with chordoma. However, subsequent biopsy from surgical tissue samples provided a definitive diagnosis. Histopathology (Fig. 3) revealed sheets of plasmacytoid cells with eccentrically placed nuclei and abundant cytoplasm. Foci of Russell bodies and amorphous amyloid deposition were also noted.

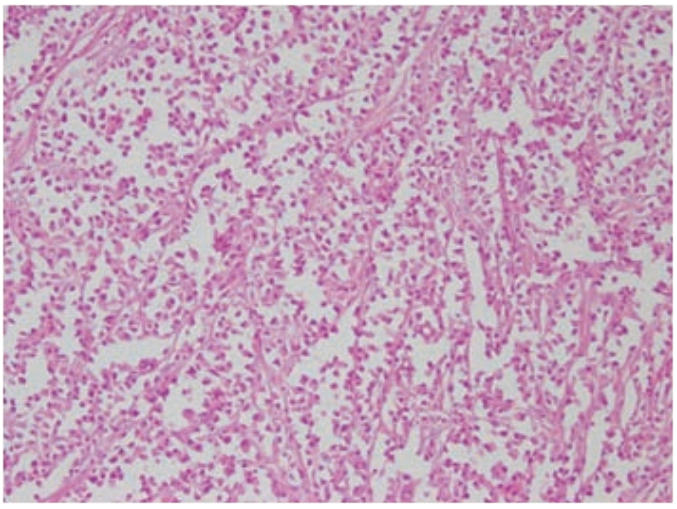


Figure-3: Plasmacytoid cells arranged in sheets, having eccentrically placed prominent nuclei with abundant cytoplasm with foci of Russell body

Discussion

Solitary plasmacytoma of bone (SPB), also referred to as osseous plasmacytoma, represents one of the two recognized forms of solitary plasmacytoma, the other being extramedullary plasmacytoma. SPB arises most commonly in the axial skeleton, particularly the vertebral bodies and skull.[6,9] It demonstrates a male predominance, with a male-to-female ratio of approximately 2:1, and the median age at diagnosis is around 55 years.[10] Local recurrence is relatively uncommon, occurring in fewer than 5% of cases, whereas dissemination to multiple myeloma has been reported in 35–70% of patients.[11]

The clinical manifestations of SPB are largely determined by the site of involvement. Pain at the lesion site is the most frequent presenting symptom, reflecting progressive bone destruction by infiltrating plasma cells. Patients may also present with a palpable painful mass, pathological fractures, or features of nerve root or spinal cord compression, depending on the anatomical location. Long bone involvement frequently predisposes patients to fractures, whereas vertebral or sacral lesions may cause neurological deficits due to compression.[11] The case we reported only presented with pain without a palpable mass, pathological fracture or features of nerve involvement.

Radiographically, SPB typically appears as a solitary expansile lytic lesion with cortical thinning and destruction, often exhibiting a "bubbly" or trabeculated pattern.[11,12] On MRI, plasmacytomas generally demonstrate homogeneous low signal intensity on T1-weighted sequences and high signal intensity on T2-weighted sequences.[13] Contrast-enhanced MRI is particularly valuable, as it shows marked homogeneous enhancement of the mass and provides superior delineation of soft tissue involvement compared to CT. Lesions in the pelvis or sacrum often display these imaging characteristics, and MRI can be especially useful in identifying subtle extensions into adjacent tissues.[14]

The diagnosis of SPB requires stringent criteria: (a) histopathological confirmation of a plasma cell tumor, (b) bone marrow plasma cell infiltration less than 10% of nucleated cells, and (c) normal skeletal survey findings apart from the primary lesion.[15,16] Additional features supporting the diagnosis include the absence of systemic events such as anemia, hypercalcemia, renal impairment, or widespread osteolytic lesions.[11] The presence of Bence-Jones proteinuria or a monoclonal band on serum protein electrophoresis does not necessarily exclude SPB, provided other criteria are met.[17,18] Our reported case met the cardinal features of SPB diagnosis; outcasting the shadow of doubt at the end.

Taken together, the rarity of SPB, especially in Asian populations, combined with its nonspecific clinical and radiological presentation, makes it a challenging diagnosis. In the present case, the sacral lesion mimicked chordoma radiologically and was initially suspected to be a different malignancy based on FNAC, before definitive histopathology confirmed plasmacytoma. This highlights the importance of a comprehensive diagnostic approach, including histopathological confirmation, biochemical workup, and imaging correlation, in differentiating SPB from other destructive sacral tumors.

Conclusion

Nonspecific clinical and radiological features of SPB often leads to diagnostic confusion with other primary sacral tumors. Failure to consider SPB as a potential differential diagnosis may expose patients to unnecessary or high-risk interventions, as these tumors

are highly vascular and although incisional biopsy was essential, it can cause profuse bleeding. Moreover, unlike chordoma, the standard treatment for SPB is local radiotherapy rather than extensive surgical resection. Diagnostic dilemma unnecessarily burdens the patient with an invasive intervention.

Author contributions

All authors participated equally in preparing, drafting and cross-checking of the study materials

Consent

Informed written consent was taken from the patient's family member to publish this case report and any accompanying images in accordance with the journal's patient consent policy.

Conflicts of Interest

The authors declare no conflicts of interest

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Data availability statement

All medical reports and corresponding images are available from the corresponding author upon reasonable request.

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REVIEW ARTICLE

Informed Consent in Low-Resource Healthcare Settings: Ethical Challenges and Practical Approaches

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Abstract:

Informed consent is a core requirement of ethical clinical practice and an important expression of respect for patient autonomy. Although international ethical guidelines strongly support informed consent, achieving meaningful consent remains difficult in low-resource healthcare settings because of structural limitations, social factors, and systemic inequities. This narrative review examines the ethical challenges of informed consent in resource-constrained environments. Using the principles of autonomy, beneficence, and justice, the review discusses tensions between universal ethical standards and real-world clinical contexts. It also explores practical approaches that support ethical consent without ignoring cultural norms or clinical constraints. The review argues that informed consent in low-resource settings should be understood as an ongoing ethical process rather than a purely legal requirement, with shared responsibility among clinicians and healthcare institutions.

Keywords: informed consent, medical ethics, low-resource settings, patients' autonomy

Introduction

Informed consent is widely regarded as a cornerstone of ethical medical practice, grounded in respect for patient autonomy and protection against coercion and harm.[1] International declarations and professional guidelines emphasise that valid consent requires adequate disclosure, patient understanding, voluntariness, and decision-making capacity.[2]

While these ethical standards are well established, their practical implementation varies considerably across healthcare contexts. In low-resource settings, including many low- and middle-income countries, healthcare delivery is often shaped by workforce shortages, overcrowded facilities, limited infrastructure, and high patient–clinician ratios.[3] These constraints make meaningful informed consent difficult and raise ethical questions about how universal principles can be applied in settings of scarcity.

This review examines the ethical challenges associated with informed consent in low-resource healthcare settings and explores context-sensitive approaches that can strengthen ethical practice. Rather than treating informed consent as a formalistic or legal obligation, this review conceptualises it as a relational and ongoing ethical process influenced by social, cultural, and institutional factors.

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Methods

This narrative review synthesises peer-reviewed literature published in English and identified through searches of PubMed, Scopus, and Google Scholar. Search terms included "informed consent," "medical ethics," "low-resource settings," "global health ethics," and "developing countries." Conceptual analyses, empirical studies, ethical commentaries, and international guidelines were included. Literature focusing primarily on research ethics was excluded unless it offered relevant insights into clinical informed consent.

Ethical Challenges of Informed Consent in Low-Resource Settings

Limited Health Literacy and Patient Understanding

Low levels of health literacy present a major obstacle to meaningful informed consent. Patients may struggle to understand medical terminology, probabilities, or the implications of treatment options, particularly when explanations are brief or highly technical.[4] Ethical concerns arise when consent is obtained without ensuring comprehension, reducing the process to symbolic agreement rather than informed decision-making.[5]

Language and Communication Barriers

In multilingual societies, discordance between clinicians and patients regarding language is common. The absence of trained medical interpreters often forces reliance on family members or informal translation, which may distort information or compromise confidentiality.[6] Inadequate communication undermines the ethical requirement of disclosure and threatens respect for patient autonomy.

Time Pressure and Systemic Constraints

Overburdened healthcare systems frequently limit the time available for patient–clinician communication. High patient volumes and understaffing may reduce informed consent to the completion of consent forms rather than meaningful dialogue.[7] This procedural approach shifts ethical responsibility onto individual clinicians while obscuring institutional accountability.

Power Imbalances and Paternalistic Practices

In many low-resource settings, physicians occupy positions of significant social authority. Patients may feel unable to question medical advice or refuse recommended interventions due to fear, dependence, or reverence for professional authority.[8] Such power asymmetries challenge the voluntariness of consent and may perpetuate paternalistic practices, even when motivated by beneficence.

Family-Centred Decision-Making

Decision-making in many cultures is embedded within family or community structures rather than centred solely on the individual. Family members may play a decisive role in consenting to treatment, sometimes withholding information from patients or overriding their preferences.[9] While relational autonomy acknowledges the moral relevance of social relationships, ethical tension arises when patient agency is diminished or excluded.

Informed Consent in the Context of Bangladesh

In Bangladesh, informed consent is recognised in professional guidelines and institutional policies, yet its implementation in routine clinical practice remains inconsistent. Public sector healthcare facilities often face severe patient overcrowding, limited consultation time, and shortages of trained healthcare professionals. These structural constraints significantly affect the quality of communication between clinicians and patients, making meaningful informed consent difficult to achieve in practice.[10]

Health literacy remains a major concern in Bangladesh, particularly among rural populations and individuals with limited formal education. Patients may agree to medical procedures without fully understanding the nature of their illness, available alternatives, or potential risks. In such circumstances, consent may be based more on trust in the physician than true understanding, raising ethical concerns about whether patient autonomy is genuinely respected.[11]

Language and communication barriers further complicate the consent process. Although Bangla is widely spoken, medical explanations are often delivered using technical terms or mixed English and Bangla that patients may find difficult to comprehend. The lack of standardised, patient-friendly consent materials contributes to misunderstanding and passive acceptance of medical decisions.[12]

Family involvement plays a central role in healthcare decision-making in Bangladesh. Family members frequently participate in discussions with physicians and may influence or even make decisions on behalf of patients. While such involvement reflects strong social support structures, it can also result in patients being excluded from conversations about their own diagnosis and treatment, particularly in cases involving women, older adults, or critically ill patients.[13]

Addressing these challenges requires context-appropriate strategies that prioritise clear communication, respect for patient dignity, and institutional responsibility. Training healthcare professionals in ethical communication, developing simplified consent materials in Bangla, and encouraging patient participation, even within family-centred decision-making models, may strengthen informed consent practices in Bangladesh without imposing unrealistic expectations on clinicians working in constrained environments.

Ethical Analysis

Autonomy in Relational Contexts

Classical bioethics prioritises individual autonomy, yet this model may inadequately reflect social realities in low-resource settings. Relational autonomy recognises that individuals' choices are shaped by social, cultural, and economic relationships.[14] However, relational autonomy should never be used to justify excluding patients from meaningful participation in decisions affecting their health and bodies.

Beneficence and Justified Paternalism

Clinicians may limit disclosure or adopt directive decision-making in the belief that doing so serves the patient's best interests, particularly when patients are

perceived as vulnerable or distressed.[1] While beneficence is ethically significant, excessive paternalism risks undermining respect for persons and eroding trust in healthcare relationships.

Approaches to Strengthening Informed Consent

Informed Consent as an Ongoing Process

Viewing informed consent as a continuous process rather than a single event allows for repeated discussions, clarification, and patient engagement over time.[5] This approach is particularly valuable in settings where time constraints limit lengthy initial discussions.

Institutional Support and Capacity Building

Meaningful informed consent cannot rely solely on individual clinicians. Healthcare institutions should provide training in ethical communication, develop simplified consent materials, and establish policies that support ethical practice in resource-constrained environments.[3]

Shared Ethical Responsibility

Understanding informed consent as a shared responsibility among clinicians, institutions, and health systems reduces moral burden on individual practitioners and promotes sustainable ethical practice. This perspective aligns ethical ideals with structural reform rather than placing unrealistic expectations on frontline providers.

Implications for Clinical Practice and Policy

Improving informed consent in low-resource settings requires both ethical reflection and structural intervention. Medical education should emphasise ethical communication and contextual sensitivity, while health policy should address systemic barriers such as workforce shortages and language services. Ethical informed consent should be recognised as an integral component of quality care rather than an optional procedural requirement.

Conclusion

Informed consent in low-resource healthcare settings presents complex ethical challenges shaped by literacy, culture, power dynamics, and systemic constraints. This review argues that meaningful informed consent is achievable when it is understood as a relational, context-sensitive ethical process rather than a purely legal formality. Balancing autonomy, beneficence, and justice requires both individual ethical commitment and institutional responsibility. Future research should further explore culturally grounded consent models and evaluate interventions that support ethical communication in resource-constrained environments.

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CORRIGENDUM

Journal of Dhaka National Medical College & Hospital

In the article titled “Leiomyosarcoma of Spermatic Cord: A Rare Malignancy” published in Journal of Dhaka National Medical College & Hospital, Volume 31, Issue 2, pages 46–48 (2025), an error was identified in the name of the fourth author.

The fourth author's name was incorrectly published as “Md. Nazirum Mubin.” The correct name is **“Nazirum Mubin.”**

Reference:

Hallaz, M. M., Hossain, M. A., Islam, M. M., Mubin, N., & Kibria, A. H. M. G. (2025). Leiomyosarcoma of Spermatic Cord: A Rare Malignancy. Journal of Dhaka National Medical College & Hospital, 31(2), 46–48. https://doi.org/10.3329/jdnmch.v31i2.87071

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