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Contents

Hypofractionation: A Practical Strategy to Expand Cancer Care in Resource-Limited Settings

Cancer care is entering a crucial period in global health. The global number of cancer cases is increasing, but this rise is not the same in all regions of the world. A large and increasing share of new cancer cases and cancer deaths now occurs in low- and middle-income countries (LMICs), where access to diagnosis, treatment facilities, and healthcare resources is often limited[1,2,3]. Radiotherapy services are still very limited in many low- and middle-income countries due to few machines, shortage of trained staff, long waiting lists, and financial barriers, which delay timely cancer treatment[4,5]. In this situation, hypofractionation is often seen as a patient-friendly or time-saving treatment. However, it is more than convenience; it is an important strategy to make cancer care more accessible, efficient, and sustainable.

For many years, most solid tumors were treated with conventional radiotherapy schedules, typically 1.8–2 Gy per fraction over five to seven weeks. Over time, growing clinical evidence has questioned this traditional approach and led to important changes in practice[6].
In breast cancer, large clinical trials have shown that shorter radiotherapy schedules, such as 40 Gy in 15 fractions or 42.5 Gy in 16 fractions, work just as well as the longer traditional treatments. More recently, even shorter regimens like 26 Gy in five fractions over one week have shown similar results in selected early-stage patients[7,8].

In prostate cancer, studies have shown that shorter radiotherapy schedules, such as 60 Gy in 20 fractions or 70 Gy in 28 fractions, give results similar to conventional treatment with acceptable side effects[9]. More recently, even shorter treatments like SBRT have shown good outcomes in selected patients[10]. This works well because prostate cancer has a low alpha/beta ratio, meaning it responds well to larger doses per fraction[11].
In rectal cancer, short-course radiotherapy (25 Gy in five fractions) is now a well-accepted option, especially within total neoadjuvant treatment protocol[12]. In lung cancer, SBRT has improved outcomes for patients with early-stage disease who cannot undergo surgery by any means[13]. In palliative setting, single or shorter course of radiotherapy schedules are commonly used to relieve symptoms quickly with less treatment burden[14].
Hypofractionation is not a compromise. It is based on basic science of radiobiology. The linear–quadratic model shows how tumors and normal tissues respond to different fraction sizes, and cancers like prostate with a low alpha/beta ratio respond well to larger doses per fraction. With modern imaging, good immobilization, image guidance, and advanced planning systems, these higher doses can now be delivered safely while protecting normal tissues[11,15].

In many countries, the demand for radiotherapy is much higher than the available machines, and issues like breakdowns and maintenance reduce capacity even more. With conventional treatment, one patient may need 25–35 sessions, which leads to long waiting lists. Hypofractionation shortens treatment time, allowing more patients to be treated with the same resources without building new facilities.
Long waiting times for radiotherapy can harm outcomes, increase patient stress, and widen the gap between urban and rural patients. Shorter treatment schedules help start treatment earlier and reduce waiting lists. They also cut travel costs and time away from work and family, making treatment more manageable, especially in LMICs where patients most often pay out of pocket.

Radiotherapy is often cheaper than many systemic treatments, but building and maintaining radiotherapy machines and facilities needs a large investment. Hypofractionation shortens treatment time, so more patients can be treated with the same machines while reducing costs and improving efficiency.

Some clinicians worry that hypofractionation may increase side effects because each fraction delivers a higher dose. This is why accurate contouring, good immobilization, image guidance, and strong quality assurance are essential. With proper training and modern techniques like IMRT, VMAT, and IGRT, hypofractionation can be delivered safely and effectively.

During the COVID-19 pandemic, many radiotherapy centers started using shorter treatment schedules to reduce hospital visits and lower infection risk. This experience showed that hypofractionation can be safe and practical for several cancers, encouraging its continued use after the pandemic[16,17].
Even with strong evidence, hypofractionation is not widely used everywhere. Many doctors were trained with conventional schedules, so changing old habits takes time. In some systems, payment models that favor more fractions can also discourage shorter treatments.

In low- and middle-income countries, building new radiotherapy machines alone is expensive and slow. A more practical approach is to optimize treatment schedules, and hypofractionation offers a faster way to increase capacity and improve access to care. Shorter regimens reduce treatment costs for patients, improve machine efficiency, and help health systems treat more people with existing resources.
For LMICs facing rising cancer burden and limited resources, hypofractionation provides a realistic path to expand treatment access. The goal of modern radiation oncology should not be the number of fractions delivered, but better outcomes, wider access, and higher value care. In that vision, hypofractionation is not simply a convenient option, but an important strategic direction for the future of cancer treatment.

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Original Article

Prevalence of Anaemia in Hospitalized Reproductive Age Group Women in A Peripheral Hospital of Bangladesh

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ABSTRACT

Background: Anaemia is a serious public health concern all over the world. It is a huge health burden for low and middle-income countries. Reproductive-age women, especially pregnant women, suffer a lot due to this condition and its consequences.

Objective: The objective of the study is to investigate the prevalence of anaemia among hospitalized reproductive-aged women in a peripheral hospital of Bangladesh.

Materials and Methods: This is a retrospective, cross-sectional study done in Shaheed Akhter Hossain BGB Hospital, Satkania, Chattogram, from June 2024 to November 2024. A total of 131 reproductive age group women (age 12-45 years) were admitted due to various problems and included in this study. Complete blood count was done and evaluated by both an automated analyzer and manual peripheral blood film examination.

Results: A total of 131 reproductive-age group women were admitted to the hospital. Among them, 56 (42.74%) were found anaemic, and the 21-30 years age group patients suffered most. Women who are married (87.5%), pregnant (51.78%), and >3rd gravida (55.17%) suffer most from anaemia. Most patients 32, 57.1%) were suffering from moderate severity of anaemia, and (58.9%) were diagnosed as microcytic anaemia and most probably iron deficiency anaemia. Other causes found are various infections, polycystic ovarian disease, abortion/miscarriage, abnormal uterine bleeding, obstetric complications, etc.

Conclusion: Hospitalized women of reproductive age are vulnerable due to a high rate of anaemia. It increases hospital stay, financial burden, morbidity, and mortality. Prevention of negative outcomes of anaemia can be done by proper detection of causes, early diagnosis, and treatment.

Keywords: *Anaemia, Iron deficiency, Haemoglobin, Reproductive Women, Pregnancy, Hospitalization.*

INTRODUCTION

Anaemia is an illness in which the number of red blood cells or the haemoglobin concentration within them is less than normal[1]. It is a very common health problem in different age groups of females, particularly among the reproductive age group. It is one of the most common nutritional deficiency disorders that affects pregnant women. According to estimates from the WHO, anemia affects 37 percent of pregnant individuals and 30 percent of women aged 15 to 49 years globally.

International data indicate that 56% of pregnant women in low- and middle-income countries are affected by anaemia[3]. The condition is most prevalent among pregnant women in Sub-Saharan Africa

Table 1. : Haemoglobin cutoffs to define anaemia severity in individuals[2]

Samples	Anaemia			
	No	Mild	Moderate	Severe
	Hb conc. (gm/dl)			
Non-pregnant	≥12.0	11.0-11.9	8.0-10.9	<8.0
Pregnancy				
First trimester	≥11.0	10.0-10.9	7.0-9.9	<7.0
Second trimester	≥10.5	9.5-10.4	7.0-9.4	<7.0
Third trimester	≥11.0	10.0-10.9	7.0-9.9	<7.0

(57%), followed by Southeast Asia (48%), while the lowest rate (24.1%) is observed in South America[4].

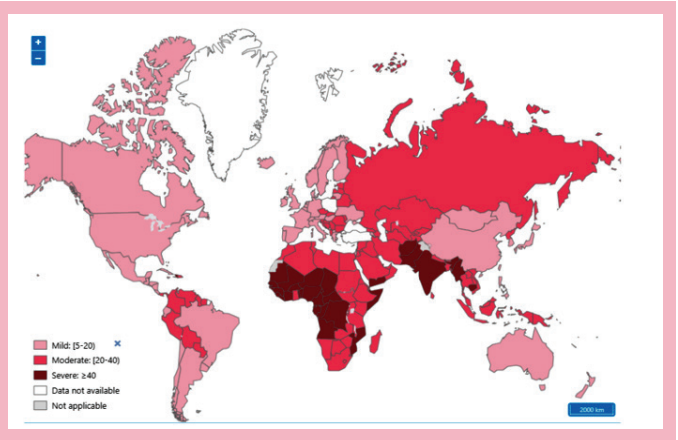

Figure 1: Prevalence of anaemia in reproductive age group women[1]

Bangladesh is a South Asian developing country which has been struggling with anaemia. In Bangladesh, anaemia affects around half of the adolescent girls (52%)[5], pregnant (50%) and lactating (49%) women.[6] About 26% of maternal deaths are caused by nutritional anaemia and postpartum haemorrhage[7]. The etiology of anaemia in women is multifactorial. From a public health perspective, iron deficiency represents the predominant cause of nutritional anaemia on a global scale.[8] Contributing factors to this deficiency include insufficient intake or bioavailability of iron-rich foods, elevated physiological iron requirements during periods of growth and pregnancy, blood loss from menstruation, and infections with intestinal parasites[4,9,10,11]. Consequently, the heightened iron demands associated with growth, menstrual cycles, and pregnancy render women of reproductive age particularly susceptible to developing anaemia[4,9,10,11]. Beyond iron, insufficiencies in other essential nutrients—such as vitamins A, C, B_2, B_{12}, folate, and copper—as well as protein-energy malnutrition, are also recognized contributors to the development of anaemia[4,10,11]. Additionally, the condition may arise from a range of hereditary disorders, including thalassemia and sickle cell disease, as well as chronic inflammatory states[4,9,10,11]. Certain infectious diseases, such as parasitic intestinal infestations, tuberculosis, malaria, AIDS, and schistosomiasis, are also significant causative factors[10,11].

Recent evidence regarding the prevalence of anaemia and its associated determinants among women of reproductive age residing in rural community settings within Bangladesh, particularly in the southern region, remains limited. This geographical area is notably vulnerable to various climate change impacts and may exhibit increased susceptibility to multiple micronutrient deficiencies[12]. Therefore, the present study is designed to assess the prevalence of anaemia among hospitalized women of reproductive age in a peripheral hospital located in Bangladesh.

MATERIALS AND METHODS

This is a retrospective, cross-sectional study done in Border Guard Hospital, Satkania, Chattogram, from June 2024 to November 2024. In that period total of 131 reproductive age group women (age 12-45 years) got admitted due to various problems and were included within this study. All data were entered into a sheet containing epidemiological, clinical, para-clinical data, and clinical evaluation of the patient. Various samples were collected to diagnose the disease of the patient. For the Complete blood count sufficient amount of blood was collected in EDTA EDTA-containing vacutainer. Then it was evaluated by a fully automated haematology analyzer, SYSMEX and CELLTAC-F. In case of various abnormal findings, peripheral blood films were manually checked by a Pathologist. Then, based on 15 parameters, of CBC diagnosis was made. Statistical analysis was performed with the Package for the Social Sciences (SPSS, version 20), and ethical clearance was taken from patients and the medical branch, BGB HQ.

RESULTS

A total 131 reproductive age group women were admitted in hospital. Among them 56 (42.74%) was found anaemic according to the definition of WHO (Figure 1). Age group of 21-30 years patients found mostly anaemic among samples (Table 1).

Anaemia was found more prevalent among married (87.5%) and pregnant women (51.78%) (Figure 2).

Among pregnant women who are >3rd gravida suffers most (55.17%) in anaemia where primi gravida suffers less (17.24%) (Table 2).

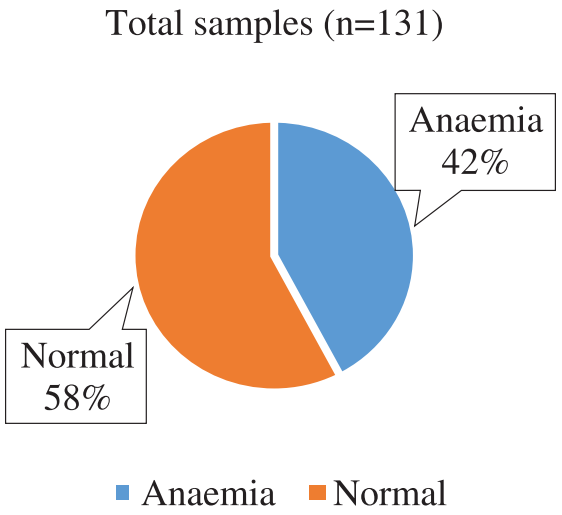

Figure 1: Total anaemic cases among total samples

Table 1- Age distribution of positive patients (n=56)

Range	Number	Percentage
12-20	6	10.71 %
21-30	38	67.86 %
31-40	11	19.64 %
41-45	1	1.79 %

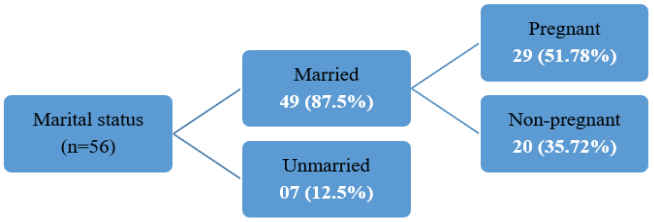

Figure 2: Marital status and pregnancy state (n=56)

Table 2 – Gravida state of pregnant women (n=29)

Gravida	Number
Primi	5(17.24%)
2nd	6 (20.68%)
≥ 3rd	16 (55.17%)

Severity of anaemia is classified into mild, moderate and severe according to WHO[2]. 32 (57.1%) patients were suffering in moderate severity anaemia. Only 2 (3.5%) patients were found suffering in severe anaemia (Figure 3).

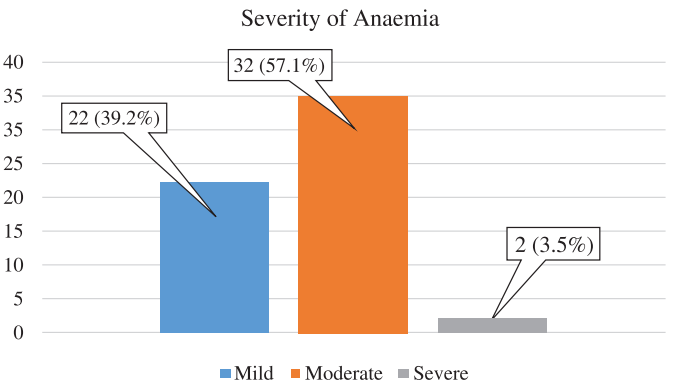

Figure 3: Severity of anaemia

MCV (mean corpuscular volume) was evaluated from complete blood count and anaemic cases were morphologically classified into microcytic, normocytic and macrocytic anaemia (Table 3). 33 patients (58.9%) were diagnosed as microcytic anaemia and only 1 (1.7%) patient was with macrocytic anaemia. By examining the peripheral blood film most microcytic anaemia slides 31 (93.93%) showed significant amount of microcytic hypochromic cells with presence of elongated and pencil shaped cells, which clearly indicates towards iron deficiency anaemia. Only 2 cases were presented with target cells which later diagnosed as HbE trait.

Table 3: Morphological classification of anaemia

Type	Number
Microcytic (MCV <83 fl)	33 (58.9%)
Normocytic (MCV 83 fl-101 fl)	22 (39.2%)
Macrocytic (MCV >101 fl)	1 (1.7%)

Anaemia is a multifactorial disease. In our hospital we categorized the causes in two main heading- Gynecological causes and Other associated disease. Among gynecological causes PCOD (Polycystic ovarian disease) was most prevalent and among associated diseases various infections could be the main cause of anaemia (Figure: 4).

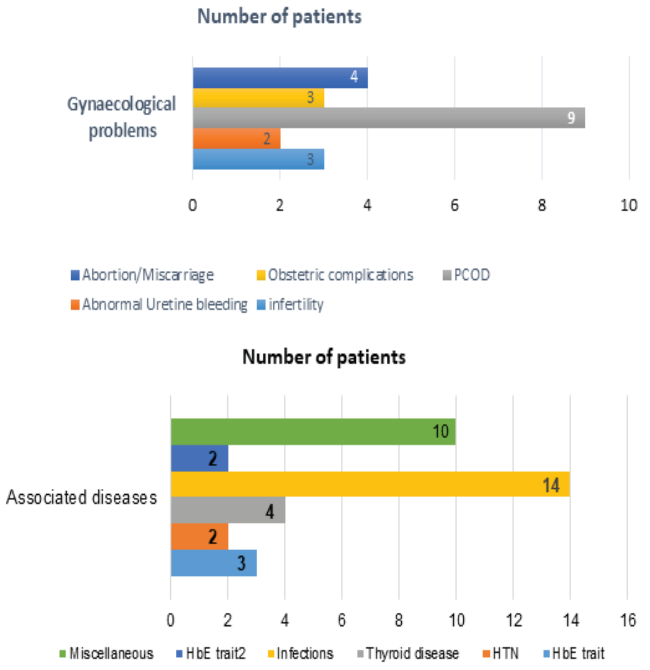

Figure 4: Number of patients according to etiology

DISCUSSION

Anaemia is a great concern in the reproductive age group of females. In Bangladesh, the number of studies on this aspect was relatively low. But according to available data, anaemia poses a considerable risk to the health of girls (adolescents), pregnant and lactating mothers, including their babies[12]. We aimed to evaluate the major types of anaemia occurring in both serving and non-serving female members of Border Guard Bangladesh and the possible causes of that anaemia. Here, the prevalence rate was about 39%, which is nearly similar to previous studies[5,13] and with the worldwide prevalence rate of 37%[14]. But it is much lower than that of related studies done in Pakistan with 76.8% [15] and in India with 62.3% prevalence rate[16]. The comparatively lower prevalence of anaemia observed in this study may be attributed to the naturally high iron concentration found in groundwater across Bangladesh[17]. Furthermore, heightened health and hygiene awareness among defense personnel—including practices such as consuming safe water, regular handwashing after restroom use, and before meals—likely contributed to reducing both the occurrence and severity of anaemic cases. A multi-country investigation involving women of reproductive age in Bangladesh, Maldives, and Nepal indicated that the consumption of safe and filtered water may serve as a protective factor, associated with decreased anaemia prevalence among women in these nations[18]. In our study, most anaemic patients fall in mild (39.2%) and moderate severity (57.1%) which is similar to another study [13], but differs from other studies[12]. Which could be due to the environment in which the defense personnel described above. The most prevalent age group to suffer from anaemia was 21-30 years in our study. This is similar to other studies[15,19]. Among the reproductive age group, Pregnant women were the most and worst sufferers. The prevalence rate of anaemia in pregnancy (51.78%) is concordant with studies[20]. Lack of diverse foods in dietary habits and increased requirement of iron during pregnancy may contribute to the development of anaemia,[21] Among pregnant mothers who are >3rd gravida, they suffer most (55.17%) from anaemia. This is similar to studies done in Bangladesh[13,19] but differs from other country studies[16,22]. From the examination of CBC and PBF, most reports in this study indicate towards Microcytic type of anaemia and most likely due to Iron deficiency anaemia, which is consistent with other International8 and national[23] studies. Among Other causes of anaemia, polycystic ovarian disease, various infections, abortion/-miscarriage, abnormal uterine bleeding, Obstetric complications, etc, constitute the major portion. These are similar causes according to the study[16]. Here total of 14 patients suffered from various organ infections, and it was the main prevalent cause. Which is similar to study[15] but other causes differ in various studies[15,24]. The difference in causes of anaemia may be due to variation in patient number, geographical location, number of ANC visits, dietary practices, etc.

LIMITATIONS OF THIS STUDY

Due to a lack of testing facilities like iron profile, Hb electrophoresis, etc., we couldn't evaluate the cause of anaemia more elaborately.

CONCLUSION

Hospitalized women of reproductive age are vulnerable due to a high rate of anaemia. It increases

hospital stay, financial burden, morbidity, and mortality. Prevention of negative outcomes of anaemia can be done by proper detection of causes, early diagnosis, and treatment.

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Original Article

Evaluation of a Rapid Dengue ICT Test in Comparison to PCR for Early Detection of Dengue Serotype in Bangladesh

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ABSTRACT

Background
Dengue virus infection is one of the major public health concerns in Bangladesh. Recently, dengue is drastically spread out in all main cities as well as rural areas. There are four serotypes of dengue virus, and their existence were already reported in Bangladesh. Dengue severity and fatal outcomes are increasing, probably due to secondary infection by a different serotype of dengue virus than the first infection. So, it is equally important to identify serotypes along with dengue virus detection.

Objectives
In this study, we evaluated a newly developed NS1 based Rapid ICT dengue serotype kit for the determination of dengue serotype in Bangladesh patients.

Methodology
A total of 98 known Dengue NS1 positive serum samples were tested with the newly developed ICT based Dengue serotype specific NS1 test kit (Osaka University, Japan). The serotype results were compared with the commercial Genesig (PrimerDesign, UK) one step reverse transcriptase real time PCR kit.

Results
Out of the 98 samples studied, 78 (79.59%) were tested positive using Dengue ICT-based serotype kit. Of these positive samples, 52 (66.67%) were identified as DENV-2, 21(26.92%) as DENV-3, 3 (3.85%) as DENV-4 and 2(2.56%) were co-infections with DENV-2 and DENV-3. On the other hand, by PCR serotype kit, we found 79 (80.61%) positive cases of which serotype of 73 (74.49%) cases showed concordance results with ICT kit. These results demonstrate that the new Dengue ICT-kit has a high serotype specificity with the PCR serotype kit, although the detection sensitivity of both these serotype kits is somewhat lower than the SD biosensor Dengue NS1 ICT kit.

Conclusion
Thus, this kit may help our community to diagnose dengue with its serotype, especially in district and rural areas where PCR laboratory facilities are not available.

Keywords: Dengue virus, serotype, rapid diagnostic test, NS1 based ICT.

INTRODUCTION

Dengue fever is one of the most common mosquito-borne viral diseases in humans, transmitted through the bite of Aedes mosquitoes. The dengue virus (DENV) belongs to the Flavivirus family and has four distinct serotypes: DENV-1, DENV-2, DENV-3, and DENV-4[1]. The existence of all serotypes of dengue virus already reported in Bangladesh. Dengue patients usually present with fever, rash, body aches, nausea or vomiting, abdominal discomfort, and sometimes bleeding[2].The initial outbreak of dengue in 2000 was caused by DENV-3 and it was predominant until 2002[3-4]. Between 2013-2016, DENV2 was predominant, followed by DENV1[5]. In 2017, DENV-2 was the most prevalent serotype and at the same time there was reemergence of DENV3 which became predominant during the outbreaks in 2019 to 2022[6-7]. DENV2 again became the predominant circulating serotype in 2023 and breaking the previous record of dengue epidemic in the country[8]. The severity of the 2023 outbreak can be partly attributed to the frequent replacement of serotypes, as reinfection with a different serotype increases the risk of severity of disease.

It is reported that subsequent reinfections with a different serotype can be much worse, because of a process called antibody-dependent enhancement (ADE).This is when pre-existing antibodies to one serotype bind to the virus particles from the new serotype that is infecting us but fail to neutralize them[9-10]. Study from different country also showed that secondary dengue infection significantly increases the risk of disease severity[11-12]. The 2023 outbreak, 321,179 hospitalized cases including 1,705 death were recorded. For the first time in the

country, the number of cases from outside Dhaka including villages (211,171) is higher than the number of cases from Dhaka city (110,008)[13]. So, it is very important to identify dengue serotype along with dengue virus detection to fight against this type of outbreak. Polymerase chain reaction (PCR) is the most preferrable method for detection of dengue serotypes, but it is costly, time consuming and needs expert technical hand and special laboratory setup. On the other hand, ICT method is simple, rapid, cost effective, less time consuming, there is no need for highly skilled personnel and can be done at field level[14]. In Bangladesh PCR laboratory facilities are mainly available at divisional level, sometimes may be in district level. But very important fact is many patients refuse to do PCR as they cannot afford the cost of these tests. So, ICT based dengue serotypes detection can be alternative way for detection of dengue including their serotype in the routine diagnosis of dengue. However, there is no commercial ICT based serotype kit available on the market.

The purposes of this study were to evaluate NS1 based multiplex ICT techniques as a screening method for the diagnosis of dengue with their serotype within a short time and thus may help our community to fight against dengue outbreak by taking necessary action.

MATERIALS AND METHODS

Patients and clinical specimens

Patients with clinical suspicion of dengue who visited Evercare Hospital Dhaka during June 2023 to August 2024 were included in this study irrespective to their age group and sex. A total of 98 samples is included in this study. Among them 78 samples were from the year 2023 and 20 samples were from the year 2024. Stored serum samples for routine assay were used from dengue suspected patients. For routine assay, 3 ml whole blood sample from adult and 0.5 ml to 1 ml from pediatric patients having clinical suspicion of dengue were collected in plain vacutainer (red top) by phlebotomist of Evercare Hospital Dhaka.Serum was separated and stocked at -80˚C until the test or RNA was extracted.

Dengue detection by NS1 antigen ICT kit

Kits from SD Bioline, Korea were used for detection of NS1 positive samples. Three drops (100 µl) of serum sample were added to the well "S" and result reading done within 15-20 minutes. Results were given after comparison with the positive control line in the device. The presence of two-color line ("C" and "T") in the result window indicates that the specimen is positive for dengue NS1 antigen, and the presence of only control line ("C") indicates negative.

Dengue Serotype detection by newly developed NS1 antigen-based ICT kit:

The newly developed kit by VisGene is used for detection of ICT based dengue serotypes. This kit was designed as two strips attached together containing two circular windows for detection of all four types of dengue. At first, 100 µL of extraction buffer was mixed with 60 µL of patient serum in a sterile microcentrifuge tube. The mixture was gently pipetted up and down for five times. Then 80 µL of the prepared sample was added dropwise in each circular window. The test results were evaluated after 15 minutes of sample application. A red line appearing at any of the test positions (labeled 1, 2, 3, or 4) indicated a positive result for the corresponding dengue virus serotype. The appearance of a red line only at the control (C) position was interpreted as a negative result. Tests that failed to show a red control line were considered as invalid (Fig: 1).

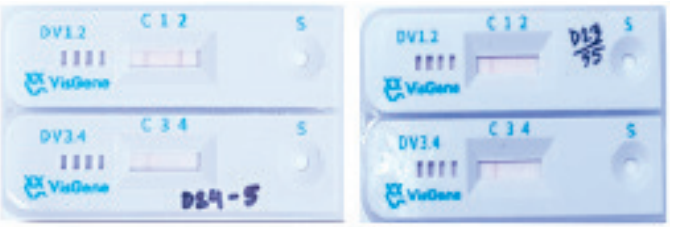

Figure 1: ICT based Serotype kit (Positive and Negative results)

RNA extraction and Serotype specific real-time reverse transcriptase PCR

The RNA was isolated by using FAVORGEN (FavorPrep Viral DNA/RNA kit, Taiwan) spin column-based extraction kit according to the manufacturer's instructions. 140µl of sample was used for RNA extraction. The elution volume was 50 µl and stored at -80˚C.

For dengue serotype identification we used commercial Genesig one step reverse transcriptase real time PCR kit from Primerdesign, UK. Four Dengue subtype specific primer and probe mixes are provided in a single tube and detected through the four different channels as described in the kit contents. The primer and probe mixes provided exploit the TaqMan® principle. Briefly, 5ul RNA was taken in 0.2ml PCR tube and then added 15ul mixed having 10ul Oasig master mix, 1ul dengue primer probe mix and 4ul nuclease free water. Reverse transcription was done in QuantStudio-5 Dx platform at 55◦C for 10 minutes followed by enzyme activation at 95◦C for 2 minutes and finally 50 cycles of denaturation at 95◦C for 10 seconds and annealing and extension together at 60◦C for 60 seconds. Then different dengue serotypes were detected in different channels according to the kit manufacturer's instruction.

RESULTS

In this study 98 samples were selected randomly, based on their laboratory confirmed dengue NS1 antigen positive report. All these samples, we further tested by newly developed Dengue NS1-based ICT and PCR based serotype kit. Out of the 98 samples studied, 78 (79.59%) were tested positive using Dengue ICT-based serotype kit. Of these positive samples, 52 (66.67%) were identified as DENV-2, 21(26.92%) as DENV-3, 3 (3.85%) as DENV-4 and 2(2.56%) were co-infections with DENV-2 and DENV-3. (Table-1)

Table-1: Serotype distribution

Years	Total samples	Serotype positive	DENV 1 N (%)	DENV 2 N (%)	DENV 3 N (%)	DENV 4 N (%)	DENV 2&3 N (%)
2023	78	64	0	42 (65.63)	21 (32.81)	1 (1.56)	0
2024	20	14	0	10 (71.42)		2 (14.29)	2 (14.29)
Total	98	78	0	52 (66.67)	21 (26.92)	3 (3.85)	2 (2.56)

By PCR serotype kit, we found 79 (80.61%) positive cases. Based on a combination of newly developed ICT serotype and PCR serotype tests, 73 (74.49%) cases showed similar results. Among them 66 cases were positive, and 7 cases were negative. About 25 (25.51%) samples do not show similar results. Of them 12 ICT serotype positive are PCR serotype negative and 13 PCR serotype positive samples are ICT serotype negative. (Table-2)

Table 2: Results of samples tested with ICT Serotype compared to PCR Serotype

		PCR Serotype (n-98)	
		Positive (n=79)	Negative (n=19)
ICT Serotype (n-98)	Positive (n=78)	66	12
	Negative (n=20)	13	7

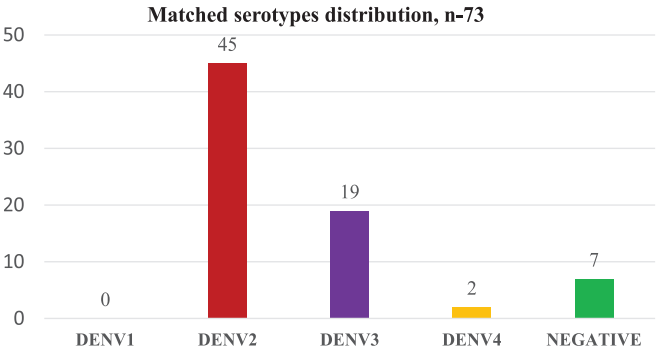

Figure 2: Matched serotype results of PCR and newly developed ICT Kit.

Though 25 samples results showed discrepancy either positive or negative but 66 positive samples in both methods showed similar serotypes results. There is no discrepancy found in serotype results. (Figure-2)

DISCUSSION

In this study, we described the diagnostic performance of the newly developed dengue NS1-based ICT serotype method in comparison to PCR serotype in patients from Dhaka, Bangladesh. To the best of our knowledge this is the first study in Bangladesh to evaluate the DENV NS1 based ICT serotype kit. By conducting this study, we have attempted to evaluate and spread the information regarding these easy methods to detect dengue serotypes.

By this method, out of the 98 samples 78(79.59%) were tested positive. Among these, 52 samples (66.67%) were identified as DENV-2, 21 (26.92%) as DENV-3, 3 (3.85%) as DENV-4, and 2 (2.56%)

were found to be co-infections with both DENV-2 and DENV-3. These results showed the ability of this kit to detect different serotypes of dengue with satisfactory sensitivity results. Another validation from Thailand also reported all serotypes with serotype specific sensitivity results. Sensitivity results were DENV-1-Specific-80%, DENV-2-Specific-90%, DENV-3-Specific-70%, DENV-4 Specific-60% respectively.15 In parallel, the PCR-based serotyping assay detected 79 positive cases (80.61%). Among these 98 samples, 73 cases (74.49%) showed similar results in both ICT and PCR serotypes methods. Of them 66 cases were positive for the same serotype, with 45 identified as DENV2, 19 as DENV3, and 2 as DENV4 and rest of 7 cases were negative. So, there is no serotype specific discrepancy found in this ICT based serotype kit in comparison with PCR serotype kit. Besides, 25 samples do not show similar results in comparison to PCR. A total of 12 ICT serotype positive samples were PCR serotype negative and 13 PCR serotype positive samples were ICT serotype negative. This type of discrepancy might be occurring in ICT and PCR, because test principles of these two methods are different. Dengue NS1 based Immunochromatography detects protein whereas PCR method detects genetic materials (DNA/RNA) though both methods are useful for early detection of dengue in clinical samples[16-17]. PCR is little more sensitive than ICT, especially for detecting low viral loads, and is considered the gold standard for diagnosis. However, ICTs, particularly rapid tests that detect NS1 antigen, are more accessible and offer quicker results for early diagnosis and management in settings without advanced lab infrastructure. Further, sensitivity, and specificity of commercial dengue ICT kits can vary depending on the kit manufacturer and the stage of disease.

Here we found that the detection sensitivity of both serotype kits (PCR and ICT) was lower than the SD biosensor Dengue NS1 ICT kit. This may happen, because in dengue screening PCR use of pan DENV primers can detect low levels of RNA, whereas the serotype-specific primers or probes for each DENV serotype may require a higher copy number for reliable amplification[18].

Our previous study also showed that all confirmed Dengue NS1 or PCR-positive samples exhibited a lower number of detectable serotypes than the actual number of dengue positivity[6-7].
Further, in multiplex assay, primers or probes for different serotypes may differ in efficiency, making the weakest target dropout in low titer samples[18].

Dengue is endemic in Bangladesh since 2000. Seroprevalence study showed that the percentage of seroprevalence in Dhaka city in 2012 is 80%[19]. So, it is expected that at present seroprevalence is further increased. On the other hand, diversity of dengue serotypes has increased, and dominance is changing after an interval of few years[6]. As a result, number of secondary dengue cases and severity has increased in recent years[7]. In this scenario, identification of dengue serotypes is important and may alert people to seek immediate health care, especially when secondary infection is caused by different serotypes than previous infection. Further, dengue serotype tests can be used in epidemic situations, as they enable rapid screening of patients and can be used in district and sub-district hospitals due to its easy method.

Our study has some limitations. One limitation is the relatively small sample size. Additionally, the multiplexing process may have reduced the kit sensitivity. Furthermore, immunochromatographic tests may fail to detect dengue viral protein during the very early stages of infection due to low concentration of proteins. We do not know the negative predictive value (NPV) as we did not test true negative samples by this method in our study.

CONCLUSION

The overall results showed that, this kit performance is comparable to PCR serotype kit for detection of dengue serotype. Though RT-PCR is more sensitive and specific for detection of dengue serotypes it requires well equipped laboratories with trained staff and its reagent is costly. So. ICT-based dengue serotypes detection can be used as alternative way for detection of dengue serotypes at least in periphery areas of our country.

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Original Article

Analysis of Immediate Adverse Reactions After Blood Donation: A Descriptive Study

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ABSTRACT

Introduction: Whole blood donation is generally considered to be a safe procedure, but occasionally adverse reactions of varying severity may occur during or at the end of the collection. The aim of this study is to analyze the frequency and type of immediate adverse reactions occurring in whole blood donation.

Material and methods: This was a record-based study conducted on all immediate adverse reactions related to whole blood donation performed over 36 months, from January 2019 to December 2021. After obtaining consent, donors were asked to complete a pre-donation questionnaire that gathered information on demographics and blood donation history. All donations were performed using 16-gauge needles from veins in the antecubital area after maintaining strict asepsis of venipuncture site. Blood collection was performed by trained technologists. Each donor was observed before, during and after donation for the occurrence of any adverse reactions. All reactions observed immediately after donation were recorded.

Results: Overall, 168 adverse reactions were reported in relation to the 32,002 donations, resulting in an overall adverse reaction rate of 0.52%, that is, an incidence of 1 in every 191 donations. Majority of donors who experienced adverse effects were in age group of 18-25 years (66, 39.3%). First time donors had higher frequency (61, 36.30%) for reactions. Vasovagal reaction of mild intensity was the most observed adverse reaction and accounted for approximately 72% of all adverse reactions noted. None of the donors with adverse reactions necessitated hospitalization.

Conclusion: The risk of complications related to blood donation is low. Analysis of blood donation-related adverse events enables identification of at-risk donors and supports the implementation of targeted motivational strategies, effective predication counseling and optimized care during and after blood donation.

Key words: *Blood, Blood donors, vasovagal reactions.*

INTRODUCTION

Blood is a vital component in resuscitation. Worldwide, blood transfusion saves millions of lives every year. The demand for blood increases by 2-3% annually[1]. Blood centers must rely on healthy, selfless donors who are prepared to donate blood without anticipating any benefit in order to maintain a safe and sufficient blood supply due to the ongoing need[2].

Although whole blood donation is typically regarded as a simple and safe process, unpleasant responses of varied degrees of severity can occasionally occur during or after collection. It is impossible to know for sure which donors will react or not. Although there are environmental, psychological, physical, and demographic risks for a reaction, these factors are generally not very predictive. So even when present, the donor is still unlikely to have a reaction[3]. Symptoms range from a mild vasovagal reaction, nausea, vomiting and hyperventilation to hematoma, nerve injury, arterial prick and may culminate in delayed syncope, cardiac arrest and seizures[4]. Donor reactions are associated with lower donor return. It is important to react swiftly to initial complaints of giddiness, lightheadedness, pallor by stopping the donation immediately. Serious adverse reactions lead to loss of consciousness encountered in only 0.008-0.3% of the donor population[5,6] .

Depending on the onset time, the adverse reactions are categorized as immediate and delayed. Immediate adverse reaction occurs during or immediately after blood donation, usually within 15 minutes of blood donation[3]. These are mild symptoms such as dizziness, , lightheadedness or phlebotomy related

bruises and hematoma that resolve promptly but are still unpleasant for the donor. Adverse reaction occurring after 15 minutes of removal of phlebotomy needle or after the donor has left the blood bank is delayed adverse reactions[3]. Although blood centers cannot completely eliminate all risks associated with blood donation, the systematic analysis of adverse reactions had led to changes in collection procedures and policies that have significantly improved safety for the most susceptible groups[2].

Hemovigilance is a system of surveillance designed to monitor, report and improve safety of blood transfusion. The goal is to identify and prevent occurrence/recurrence of transfusion related unwanted events in order to increase the safety, efficacy and efficiency of blood transfusion. In recent years, blood centers have focused on the practical application of donor hemovigilance, which is an effort to monitor, track and trend reactions after blood donation, in order to design and implement preventive measures[7]. The Association for Advancement of Blood and Biotherapies (AABB) has proposed the establishment of a national hemovigilance program that would include a donor adverse reaction[8]. A nationwide hemovigilance system has not yet been established in Bangladesh. While a few tertiary care centers have initiated monitoring of donor reactions, there is currently no systematic analysis or utilization of the collected data. However, the implementation of a structured hemovigilance system is imperative to enhance transfusion safety and ensure evidence-based improvements and quality nationwide.

The aim of this study is to analyze the frequency and type of immediate adverse reaction occurring in whole blood donation so that appropriate actions can be taken through proper educational processes to prevent occurrence and recurrence of these reactions.

MATERIAL AND METHODS

This was a record-based study conducted on all immediate adverse reactions related to whole blood donation performed over 36 months, from January 2019 to December 2021at Transfusion Medicine Department of Evercare Hospital Dhaka. The criteria for the selection of eligible blood donors used by the department were adapted from WHO blood donor selection criteria. Informed consents were collected from all donors. After obtaining consent, donors were asked to complete a pre-donation questionnaire that gathered information on demographics and blood donation history. A warm, friendly and comfortable atmosphere for donors was provided. All donations were performed using 16-gauge needles from veins in the antecubital area after maintaining strict asepsis of venipuncture site. Blood collection was performed by trained technologists. Each donor was observed before, during and after donation for the occurrence of any adverse reactions. All reactions observed immediately after donation were recorded. The department has a protocol for managing adverse donor reactions. Donors were given refreshment and retained in the recovery room for at least 15 minutes before leaving. They were advised to communicate with the transfusion medicine department if they feel any complaints afterwards. Once the donor recovered, a detailed report was filled by a technologist. Other adverse reactions that were reported later were not included.

RESULTS

Overall, 168 adverse reactions were reported in relation to the 32,002 Donations, resulting in an overall adverse reaction rate of 0.52%, that is, an incidence of 1 in every 191 donations. There was a male dominated donor pool (97.6%) who consisted mainly of young adults (Table 1). Directed donations have been shown to be more popular (70.3%) than replacement donations (29.7%).

Majority of donors who experienced adverse effects were in age group of 18-25 years (66, 39.3%) (Table 2). First time donors had higher frequency (61, 36.30%) for reactions. Vasovagal reaction of mild intensity was the most observed adverse reaction and accounted for approximately 72% of all adverse reactions noted (Table 3). The mean weight of blood donors who experienced adverse reactions was 52 kg. Most of the adverse reactions occurred in the blood donation room. No instances of faint-

ing/loss of consciousness or other more serious reaction types were observed. None of the donors with adverse reactions necessitated hospitalization.

We tried to analyze the incidence of adverse events among different blood groups and found that 'O' positive blood donors had the highest reaction (29.16%) among other blood group donors and lowest in 'AB' negative (1.2%) (Table 4). There were no adverse events in 'O' negative donors.

Table 1: Distribution of donors by gender

Gender	Total number (n)	Percentage (Among regular donations)
Male	31,230	97.6
Female	772	2.4

Table 2: Distribution of adverse reactions according to age group

Age Range	Total number (n)	Percentage (%)
18 - 25 years	66	39.3
26 - 40 years	59	35.1
41 - 60 years	43	25.6

Table 3: Distribution of donors according to adverse reaction

Adverse reactions	Total number (n)	Percentage (%)
Vasovagal reaction	121	72
Nausea	23	13.7
Vomiting	2	1.2
Dizziness	15	8.9
Hematoma	2	1.2
Extravasation	5	3

DISCUSSION

Various factors like age, sex, height and weight as well as other factors such as proper nutrition, adequate sleep, first time donation status, stress, lack of drinking before donation, fear of donation and finally the volume of donated blood can cause the occurrence of adverse reactions[9]. Also behavior of collection staff, use of donor chairs versus flat

Table 4: Distribution of adverse events according to blood group

Blood group	Frequency (n=168)	Percentage (%)
'A' positive	48	28.6
'B' positive	32	19.4
'AB' positive	21	12.6
'O' positive	49	29.2
'A' negative	9	5.4
'B' negative	6	3.6
'AB' negative	3	1.2

bed and methodology used to obtain information impact the donation process. Published international data indicate a board range of reported reaction rates (<1% to >20%), reflecting significant variability in the classification of complications and methods used to quantify severity[2]. Therefore, direct comparison of blood donation complication data between countries is difficult. This difference even exists in the studies conducted in the same country. We recorded only adverse reactions during the donation period and stay in the recovery room. We found the overall rate of complications related to blood donation to be low, even when considering all mild complications. Our reaction rate is in accordance with various studies conducted all over the world[4,7,10,11].

In our study, majority donors who experienced adverse reactions were young (18-25 years). Young donors have 3-fold more likely to experience adverse reactions than older. In 2008, the AABB Task Force recommended that blood centers implement one or more strategies to reduce adverse reactions among young donors and establish monitoring programs to continuously assess donation safety[2]. Our study also revealed that first time donors had higher frequency of reactions. A Greek study found first-time donors (1.7 vs 0.68%) had a significant greater possibility to have a reaction[12]. Repeated donation status lowered the chance of adverse reactions. In one study, 9% of donors who had adverse reactions at their first donation did not return for the subsequent donation[13].

Vasovagal reactions are most frequently reported adverse events associated with whole blood donation and are generally attributed to physiological responses to acute intravascular volume changes and autonomic dysregulation occurring during or shortly after phlebotomy. It is worth noting that the maximum volume of blood withdraw during the donation (450+- 10%) represents only about 10% of the total blood volume in a subject weighing 70kg. Since at least 800-1,500ml of blood ie 15-20% of the total blood volume would have to be lost in order to be in at least class I risk of hypovolemia, blood donors are unlikely to experience severe vaso vagal reactions[10]. In the present study, vasovagal reactions accounted for 72% of all donation related adverse events, highlighting their predominance within our donor population. This observation is consistent with previous epidemiological studies identifying vasovagal reactions as the leading cause of donor complications[7,10]. Vasovagal reactions in our study were significantly associated with younger age, female sex and first-time donation status. The higher incidence observed among younger donors may reflect increased autonomic responsiveness and reduced hemodynamic tolerance to blood volume shifts. In contrast, age-related improvements in cardiovascular and autonomic stability may contribute to the lower frequency of reactions among older donors. Published data indicate that vasovagal symptoms occur approximately 2-5% of blood donors, with syncope reported in 0.34-0.8%[14]. Although most reactions are transient and self-limiting, their high relative contribution to overall adverse events particularly among first time and younger donors has important implications for donor safety and retention. These findings support AABB recommendations for targeted preventive measures and continuous monitoring to reduce donation-related reactions and enhance overall donor safety. Preventable measures could be addressing fear in potential donors, improving donor attitude, water fluid preloading and application of muscle tension and decrease blood donation duration.

South east Asia account for 25% of world's population and collects only 9% of the world's blood supply. Bangladesh annual demand is 2,00,000 -2,50,000/year but hardly met[15]. In US 2016, 30,868 blood donations were investigated, of which 0.34% had caused systemic reactions in donors[16]. Blood centers should have an effective and comprehensive program to monitor donor complications as the keystone of a donor safety program. A supportive hospital-based donation environment is essential to ensure donor safety and promote donor satisfaction, both of which are critical for encouraging repeat blood donation. Provision of a friendly, comfortable and reassuring atmosphere has been shown to reduce donor anxiety and improve overall donation experience. Engaging donors in calm conversation, particularly those who are anxious, during phlebotomy may serve as a distraction and help mitigate stress related reactions. Whole blood collections utilize large-bore (16 gauge needles) for phlebotomy, which achieve rapid blood flow and minimize clotting and hemolysis but also introduce a risk of injury. Established phlebotomy guidelines highlight the importance of staff training and technical competence. History of past donor reaction places the donor at higher risk for another reaction.

Adequate hydration before donation along with nutritional intake is considered an important preventive measure by many. The mechanism is thought to be gastric distention, increasing sympathetic activation[5]. In the current study, reactions were mild and limited to nausea, vomiting, dizziness, hematoma and extravasation. No nerve injury was noticed. Even minor reactions and transient symptoms discourage return donation by 36%, with more severe reactions further decreasing the likelihood by 66% .

Limitations of this study were that delayed adverse reactions were not included which occur after the donor had left the department.

CONCLUSION

The prevalence of adverse reactions in our study was low. Our study confirms the fact that blood donation is a very safe procedure which can be made even more event-free by designing protective practices. Donor safety is an integral and very

important component of blood transfusion safety which needs to be strengthened through regular appraisal of adverse reactions that occur following blood donation.

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Case Report

Multimodality Imaging of Carotid Body Paraganglioma: Radiological Diagnosis and Characterization – A Case Report

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ABSTRACT

Background: Carotid body tumors (CBTs) are rare, highly vascular neuroendocrine tumors originating from paraganglionic cells in the carotid bifurcation.

Case Presentation: We report the case of a 21-years-young female who presented with a painless, gradually enlarging neck mass on the left side of her neck. Imaging studies, including ultrasound and contrast-enhanced computed tomography, confirmed the presence of a well-defined, hypoechoic mass at the left carotid bifurcation, displacing adjacent vessels. A multidisciplinary team planned surgical resection, guided by imaging, resulting in the successful removal of the tumor. Histopathological examination confirmed the diagnosis of a carotid body tumor.

Conclusion: Although rare, carotid body tumors should be considered in the differential diagnosis of neck masses in young patients. Early diagnosis with appropriate imaging and meticulous surgical planning can make promising outcomes in carotid body tumors.

Key words: *Carotid body tumors, Neuroendocrine tumors, Paraganglionic cells*

INTRODUCTION

Carotid body tumors (CBTs), sometimes called carotid body paragangliomas, are uncommon neuroendocrine tumors that originate from the paraganglionic cells of the carotid body, a chemoreceptor situated at the common carotid artery's bifurcation. These tumors, which make up around 0.5% of all head and neck neoplasms, have a mostly benign clinical course and sluggish development are typically benign[1].

Despite their rarity and slow-growing nature, CBTs present significant diagnostic and therapeutic challenges due to their hypervascularity and intimate relationship with critical neurovascular structures, including the internal and external carotid arteries and the lower cranial nerves (IX–XII). The most typical clinical presentation of CBTs is a painless, progressively growing lateral neck lump. While many patients remain asymptomatic, larger tumors may cause symptoms associated with the local mass impact, such as dysphagia, hoarseness, and respiratory compromise[2].

Imaging plays a pivotal role in making the diagnosis, assessing the size of the tumor, and directing surgical planning. Modalities such contrast-enhanced computed tomography (CECT), magnetic resonance imaging, digital subtraction angiography, and color Doppler ultrasonography are especially useful[1,2] . The characteristic splaying of the internal and external carotid arteries, the "lyre sign"—is a pathognomonic finding on cross-sectional imaging.

Here, we report a case of a carotid body tumor in a young female patient, highlighting the key radiological features, diagnostic workup, and successful

surgical management. This case underscores the importance of including CBT in the differential diagnosis of neck masses in young adults to facilitate timely intervention and minimize morbidity.

CASE REPORT

A 21-year-old female presented with a painless neck mass that had gradually increased in size over the past 8 months. She denied associated symptoms, such as difficulty in breathing, swallowing, changes in voice or cranial nerve deficits. There was no history of trauma, weight loss, or systemic illness.
On physical examination, a non-tender, firm, well-circumscribed mass was palpable in the left carotid triangle. The mass was mobile in the horizontal plane but demonstrated limited vertical mobility. No cervical lymphadenopathy was detected. No other significant physical findings were observed, and the patient's vital signs were within normal limits.

Neck Ultrasound revealing a well-defined, hypoechoic mass located at the left carotid bifurcation. Doppler examination demonstrated a solid vascular mass that displaced the internal carotid arteries (ICA) and external carotid arteries (ECA) demonstrating a characteristic splaying sign of ICA & ECA the classic "lyre sign" (Figure 1a, 1b, 1c). No suspicious lymphadenopathy or other abnormal findings were detected.

Subsequent Contrast-enhanced computed tomography (CT) scan of the neck confirmed the presence of a well-defined, avidly enhancing soft tissue mass measuring 4.9 cm (CC) x 3.8 cm (AP) x 2.9 cm (T) in the left carotid bifurcation region with splaying and encasement of left ICA and ECA (Figure 2a, 2b). The lesion demonstrated the characteristic lyre sign, with splaying and partial encasement of the left internal carotid artery (ICA) and external carotid artery (ECA), while maintaining normal distal flow (Figure 2A, 2B). Based on the degree of vessel encasement, the tumor was classified as Shamblin Class II. The mass extended deep to the left sternocleidomastoid muscle but showed no evidence of intracranial extension. The contralateral carotid vessels and intracranial circulation were unremarkable. These imaging findings were highly suggestive of a carotid body paraganglioma.

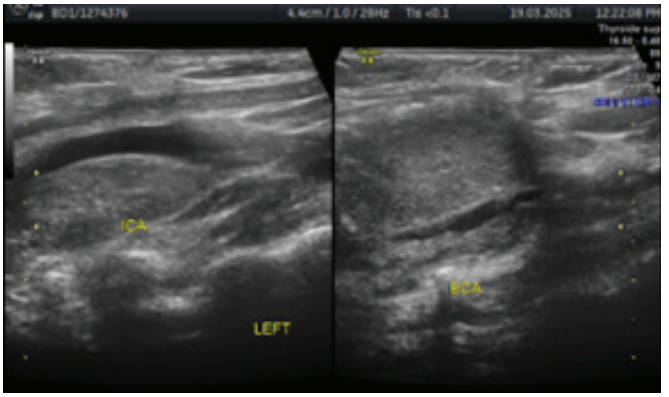

Figure: 1a

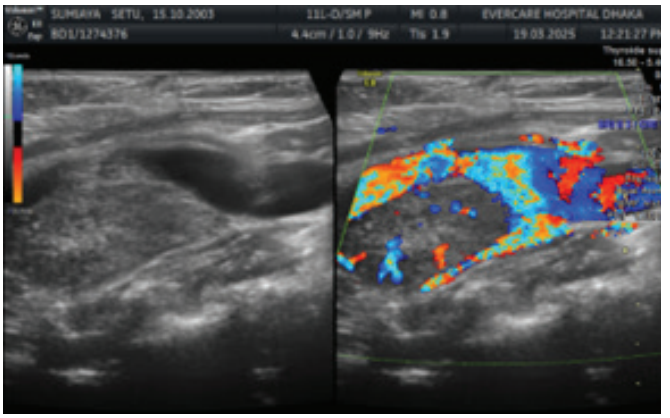

Figure: 1b

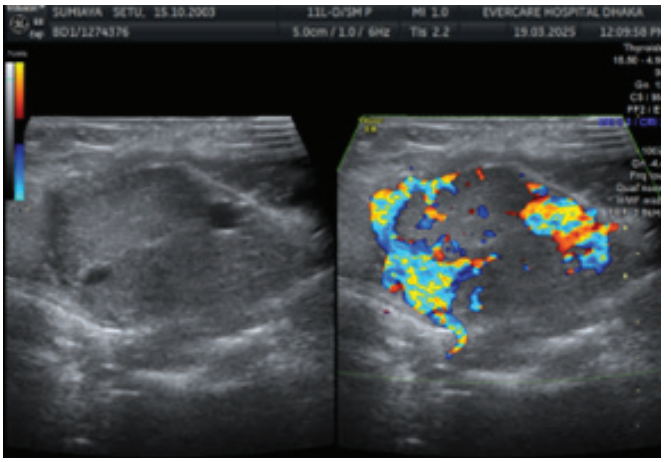

Figure : 1c

Figure: Longitudinal (1a & 1b) and transverse (1c) grayscale and color Doppler views of the neck displaying a solid mass causing displacement of the internal and external carotid arteries demonstrating a characteristic splaying sign of ICA & ECA.

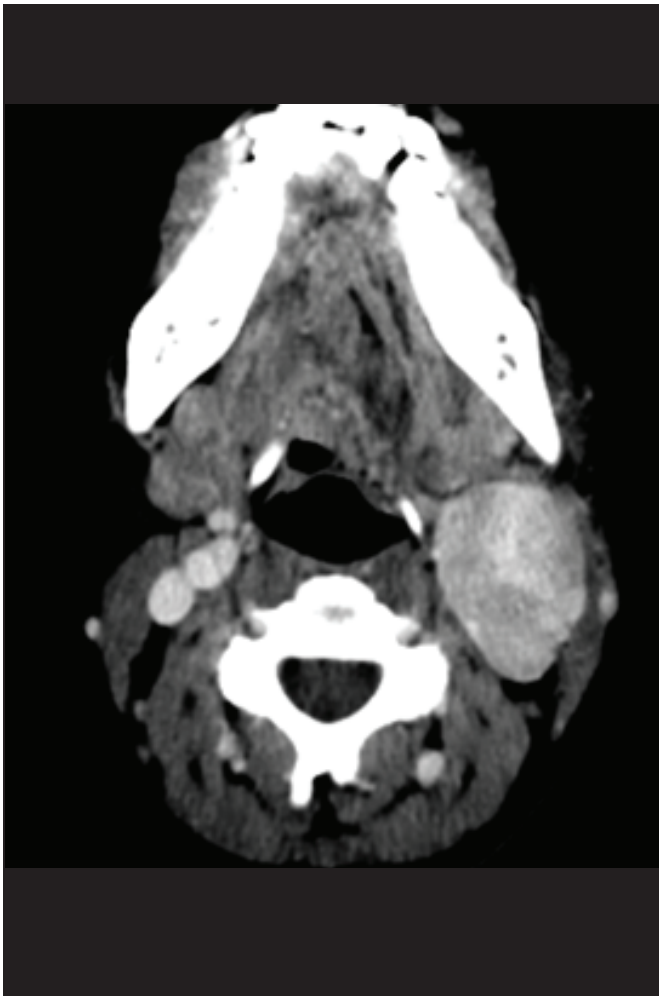

Figure 2a: Axial contrast-enhanced CT image (A) of the neck revealing a prominently enhancing mass located in the notch between the internal and external carotid arteries.

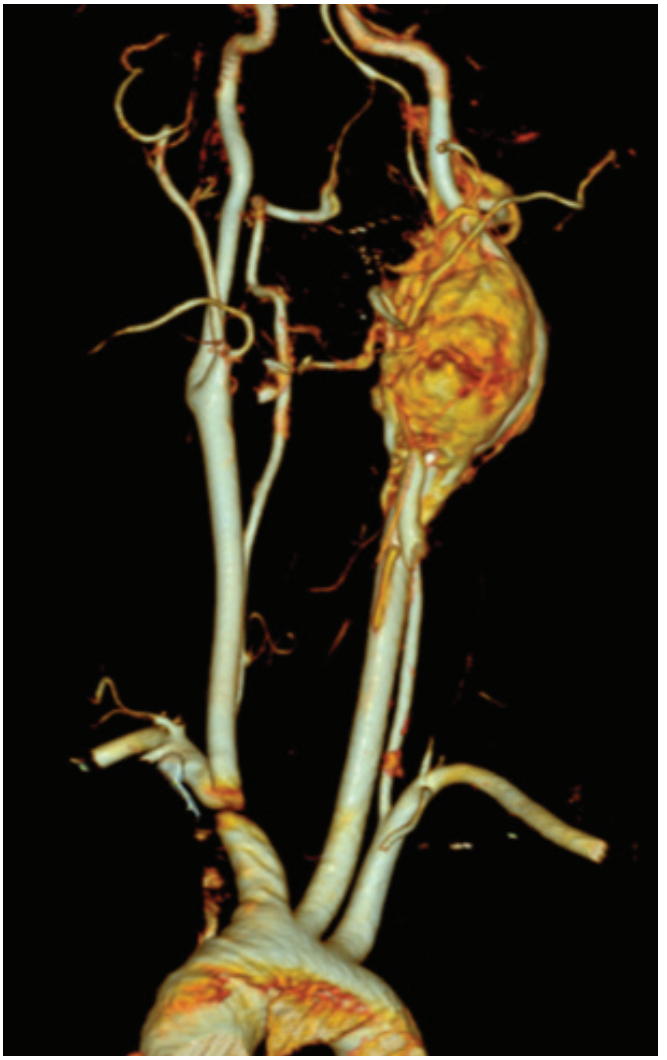

Figure 2b: Three-dimensional volume-rendered CT image (B) illustrating the carotid body tumor.

Following multidisciplinary team (MDT) discussion involving vascular surgeons and head and neck surgeons, surgical resection was planned as the definitive treatment considering the tumor size and vascular nature. Under general anesthesia, excision of the carotid body tumor was performed while preserving the integrity of the carotid artery and other vital structures.

Histopathological examination of the excised tumor shows nests of epithelioid cells arranged in distinctive nests separated by prominent fibrovascular stroma. These findings were consistent with the diagnosis of a carotid body tumor (Figure 3).

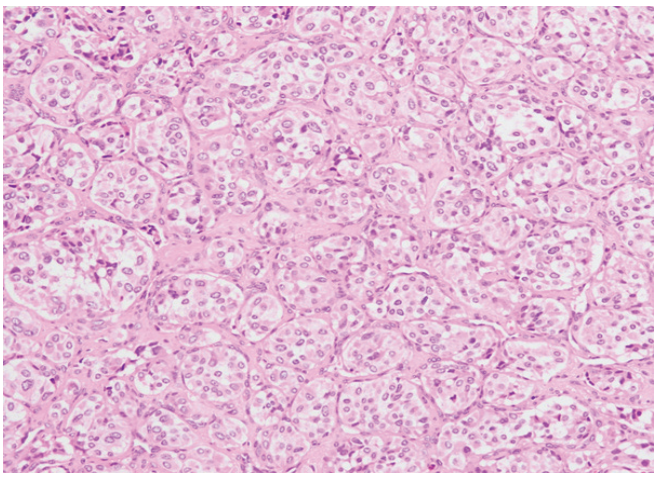

Figure 3: Histopathological picture of tumor composed of cohesive nests of epithelioid cells, embedded within a prominent fibrovascular stroma—findings diagnostic of a carotid body tumor.

DISCUSSION

Carotid body tumors are rare neuroendocrine tumors that originate from the neural crest–derived paraganglionic cells of the carotid body. They represent the most frequent type of head and neck paraganglioma and are typically slow growing but highly vascular lesions. Accurate preoperative diagnosis of carotid body tumors is essential for appropriate management and surgical planning[2]. In our case report, we utilized multiple imaging modalities to confirm the diagnosis and assess tumor characteristics.

Ultrasonography with Doppler is a valuable initial imaging modality for CBTs, offering high specificity and sensitivity. It enables the identification of a well-defined, hypoechoic mass located at the carotid bifurcation, often accompanied by a hyper-vascular appearance and low-resistance arterial flow pattern3. The ability of Doppler imaging to demonstrate hypervascularity and vessel displacement producing pathognomonic "goblet deformity" makes it particularly useful in differentiating CBTs from lymphadenopathy or other solid neck masses. Further evaluation with contrast-enhanced computed tomography (CT) provides detailed anatomical delineation and enables accurate assessment of tumor size, degree of vascular encasement, and its relationship to adjacent neurovascular structures information that is crucial for surgical planning. A characteristic radiologic feature is the splaying of the internal and external carotid arteries, commonly referred to as the "Lyre sign," which strongly supports the diagnosis of a carotid body tumor. In our case, CT imaging demonstrated a well-defined, homogeneously enhancing soft tissue mass at the carotid bifurcation exhibiting this classic vascular splaying pattern[4].

The main radiologic differential diagnoses include vagal paraganglioma, schwannoma, metastatic lymphadenopathy, and carotid artery aneurysm5. Unlike CBTs, vagal paragangliomas typically displace both carotid arteries anteromedially without producing symmetric splaying at the bifurcation.

Although imaging establishes diagnosis, treatment decisions require multidisciplinary input. Surgical resection remains the primary treatment modality for carotid body tumors, aiming for complete excision while preserving the integrity of vital structures, such as the carotid artery and adjacent nerves. However, the use of radiotherapy as a primary treatment approach for carotid body tumors has been debated. Some studies suggest that these tumors are not highly radiosensitive and may exhibit regrowth after suppression. Therefore, surgery is usually preferred for younger, healthier patients, while radiotherapy is considered for elderly patients or individuals who are poor surgical candidates[6,7].

CONCLUSION

This case highlights the pivotal role of multimodality imaging in accurate diagnosis and characterization of carotid body paraganglioma. Doppler ultrasonography and contrast-enhanced CT provide essential information regarding tumor vascularity, extent, and relationship to adjacent neurovascular structures. Early radiological diagnosis, combined with appropriate multidisciplinary management, is crucial for optimizing patient outcomes.

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Case Report

Endometrial Carcinoma with Peritoneal Inflammatory Nodules Mimicking Peritoneal Carcinomatosis: A Case Report from Bangladesh

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ABSTRACT

Background: Peritoneal inflammatory nodules are rare, non-neoplastic lesions that can be associated with endometrioid carcinoma of the uterus. Grossly, these lesions may closely resemble peritoneal carcinomatosis, creating significant intra-operative diagnostic dilemmas and risking erroneous upstaging.

Case Presentation: We report a case of a 65-year-old postmenopausal woman with endometrioid carcinoma in whom widespread multiple "seedling-like" pelvic peritoneal deposits were observed intra-operatively and were suspicious for advanced disease. Total abdominal hysterectomy with bilateral salpingo-oophorectomy, pelvic lymphadenectomy, and pelvic peritonectomy were performed. Comprehensive Histopathological examination confirmed endometrioid carcinoma with <50% myometrial invasion and negative pelvic lymph nodes. Peritoneal and omental samples showed inflammatory changes without evidence of tumour deposit, confirming a final pathological stage of pT1aN0. The patient was managed according to early-stage disease and received adjuvant vaginal brachytherapy alone.

Conclusion: Recognizing this benign condition prevents incorrect staging and unnecessary treatment. This case highlights the importance of this distinction.

Key words: *Endometrial carcinoma, malignant Peritoneal nodules, Peritoneal carcinomatosis mimic*

INTRODUCTION

The intraoperative discovery of disseminated peritoneal deposits during surgery for endometrial carcinoma raises immediate concern for advanced disease, influencing staging, prognosis, and adjuvant treatment[1,2]. However, not all such nodules represent metastatic implants[3,4]. Benign inflammatory and reactive conditions including foreign-body granulomas, fibrinous adhesions, and nonspecific inflammatory nodules can grossly mimic carcinomatosis, creating a major diagnostic dilemma[5,6,7].
This distinction carries critical implications, as misinterpreting a benign process as metastatic disease can lead to erroneous surgical upstaging, unnecessary extended surgery, inappropriate systemic chemotherapy, and significant patient distress. Conversely, correct identification allows for accurate staging and conservative, stage-appropriate management[2].
Since visual inspection alone is insufficient, definitive diagnosis relies on histopathological examination. This case highlights the importance of correlating operative findings with histology to ensure accurate staging and appropriate postoperative treatment.

CASE PRESENTATION

A 65-year-old postmenopausal Bangladeshi woman (P2G2, 1NVD+1C/S, menopausal for 15 years) presented in November 2021 with a primary complaint of postmenopausal vaginal bleeding of two weeks' duration. She had hypertension and hypothyroidism, managed medically. She had no history of hormone replacement therapy or diabetes. Obstetric history revealed para 2 (one normal vaginal delivery of twins and one caesarean section).

She had been married for 42 years with ALC 29 years. Past surgical history included one lower uterine caesarean section (LUCS) in 1992.

Clinical examination revealed a soft, non-tender abdomen. A transvaginal ultrasound (23/11/2021) identified a bulky uterus with a thickened, irregular, and echogenic endometrium (13 mm) containing a moderate hemorrhagic collection. An initial cervical Pap smear (22/11/2021) was reported as an atrophic smear, negative for malignancy.

Following multidisciplinary evaluation, the patient underwent a planned total laparoscopic hysterectomy with bilateral salpingo-oophorectomy and frozen section biopsy on 29/11/2021. A frozen section of the endometrial tissue was reported as positive for malignancy.
Upon laparoscopic entry, however, intra-operatively, multiple scattered “seedling-like” deposits were noted over the uterine serosa, bilateral fallopian tubes, pouch of Douglas, pelvic peritoneum, and over the rectum, raising strong suspicion of peritoneal spread (Figure 1A &1B). The bladder wall, liver surface, and undersurface of the diaphragm were described as free of deposits(Figure 2A &2B). In view of these findings, the procedure was converted to laparotomy through pfannenstiel incision. The patient underwent A full staging operation, which was extrafascial hysterectomy, bilateral salpingo-oophorectomy, bilateral pelvic lymphadenectomy, and pelvic peritonectomy. The resected uterus with both adnexa with both sided pelvic lymph nodes, and pelvic peritoneum sent for histopathology.

Pathological Findings

The final histopathology report of all submitted specimen provided the critical diagnostic clarification. It confirmed moderately differentiated endometrioid carcinoma, (FIGO grade II), confined to the uterine corpus. The tumor invaded less than 50% of the myometrial thickness The cervix and lower uterine segment were uninvolved. Lymphovascular invasion was not identified. Both adnexa were free of tumour (pT1a). A total of nine pelvic lymph nodes the right external iliac, right internal iliac, and left iliac basins were free of metastatic carcinoma (pN0).
Most significantly, the submitted specimen of pelvic peritoneum, representative of the intraoperatively suspicious deposits, was histologically "Free of metastasis." Microscopic examination revealed focal areas of increased inflammatory cell infiltration but no evidence of viable malignant cells. The ovarian surfaces and adnexa were also uninvolved (Figure 3).

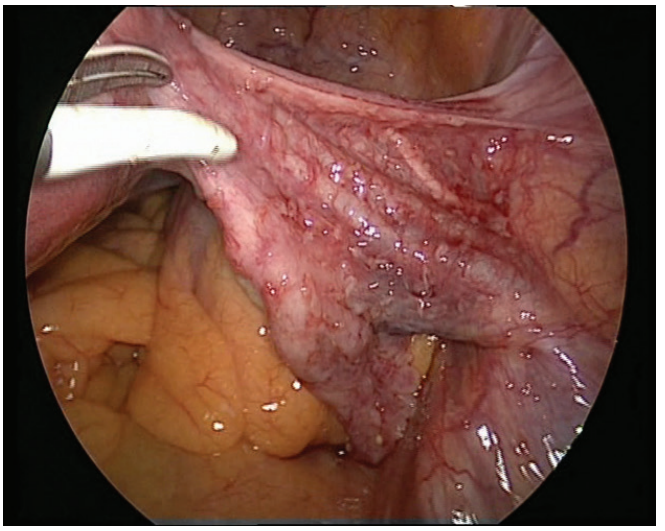

Figure 1(A): Pelvic peritoneal surface & tube showing multiple small, whitish “seedling-like” nodules suspicious for peritoneal deposits.

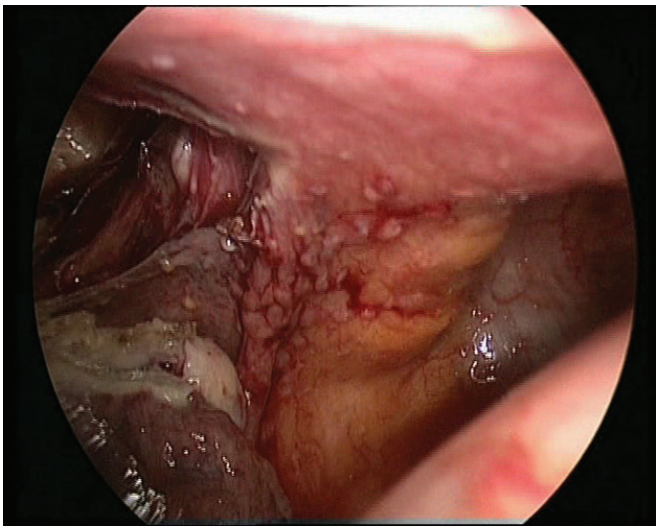

Figure 1(B): Rectouterine pouch (pouch of Douglas)/pelvic peritoneum demonstrating clustered nodular lesions suspicious for deposits.

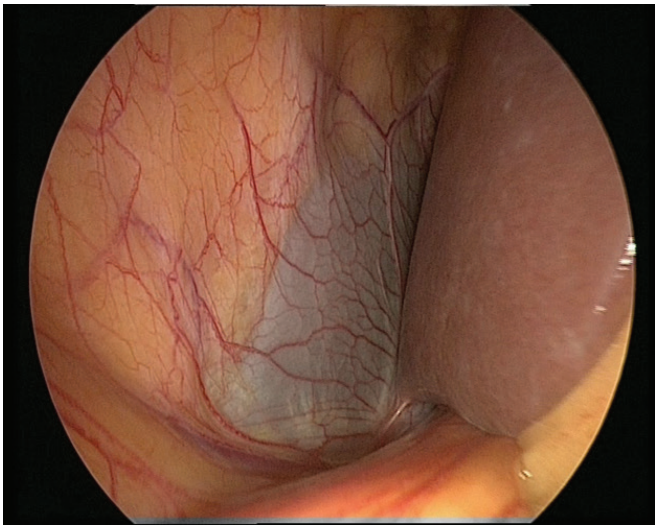

Figure 2(A): Peritoneal surface of Liver and upper abdominal wall appears smooth without visible nodules

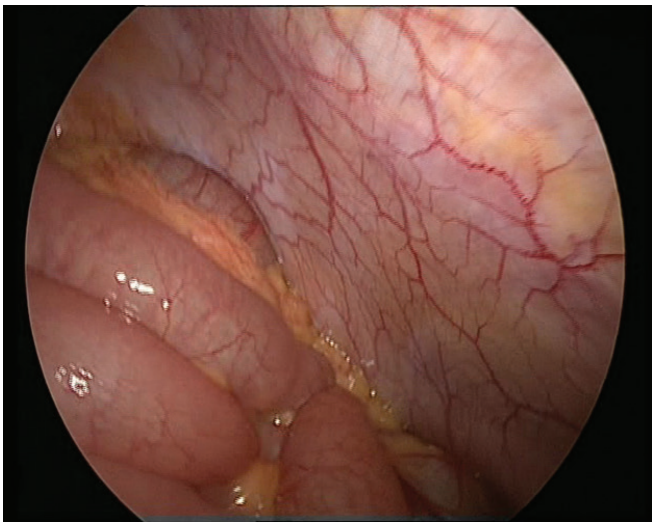

Figure 2(B): smooth peritoneal surface/organ serosa with normal vascular pattern; again No gross peritoneal deposits seen in the exta-pelvic portion of abdomen.

Overall, the findings supported early-stage disease (pT1aN0; FIGO IA) with no histologic evidence of peritoneal metastasis despite the suspicious intra-operative appearance.

Subsequent treatment decision and follow-up

Because peritoneal metastasis was excluded on histopathology and the final stage remained FIGO IA (grade II), the patient was managed according to early-stage risk-adapted treatment rather than advanced disease. The patient successfully completed adjuvant vaginal vault brachytherapy using a cylinder applicator, 7 Gy × 3 fractions (total 21 Gy) delivered between 03/02/2022 and 16/02/2022 and tolerated treatment without major complications.

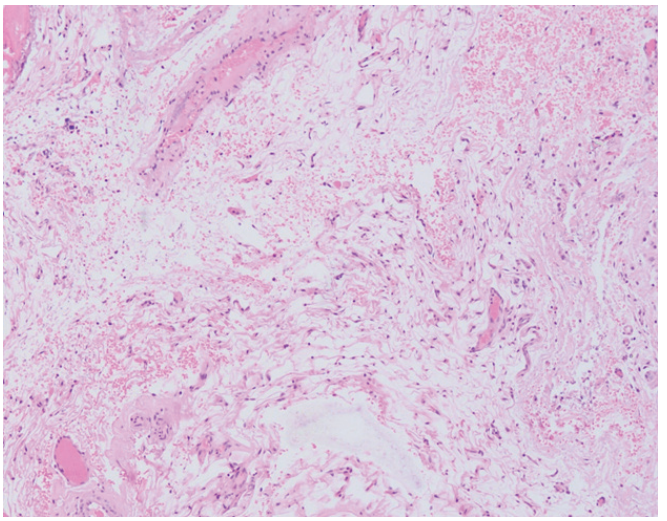

Figure 3: Microscopic view of Omental tissue suspicious for tumour deposit on Laparoscopy: Free of tumour showing focal increase infiltration of inflammatory cells.

The patient was placed on a standard surveillance protocol for early-stage endometrial carcinoma, adhering to the consensus schedule of clinical evaluations every 3–4 months for the first two years, transitioning to every 6 months thereafter. At each visit, a detailed symptom history was obtained and a physical examination including a speculum and bimanual pelvic exam to evaluate the vaginal vault was performed. A post-treatment surveillance FDG PET-CT scan, obtained in January 2022, showed no evidence of metastatic disease. Findings were limited to postoperative inflammatory changes in the operative bed and a non–FDG-avid subpleural pulmonary nodule, the latter being managed with interval imaging follow-up. In addition, serial vault smear cytology has been consistently negative for malignant cells from January 2022 through the most recent follow-up in April 2025.

With over 50 months (approximately 4 years) of follow-up since surgery, the patient remains asymptomatic and clinically well, with no evidence of local recurrence or distant metastasis.

DISCUSSION

Peritoneal "seedling-like" deposits seen during staging surgery for endometrial carcinoma are understandably concerning, as they may suggest extrauterine spread and can immediately influence operative strategy and adjuvant treatment planning[8,9]. In our patient, multiple deposits were described over the uterine serosa, fallopian tubes, pouch of Douglas, pelvic peritoneum, and rectal surface, creating a strong intraoperative impression of peritoneal involvement.

However, the final histopathology told a different story: the uterine primary was endometrioid carcinoma, FIGO grade II with <50% myometrial invasion, no LVSI, negative pelvic nodes, and the pelvic peritoneum was free of metastasis. Furthermore, the omental tissue sampled from a suspicious area showed only focal inflammatory cell infiltration without malignant cells, supporting a benign inflammatory/reactive process. Taken together, the comprehensive findings reinforced the disease being early-stage disease (pT1aN0; FIGO IA)

This mismatch between the gross laparoscopic appearance and histology highlights an important practical point for both surgeons and pathologists: peritoneal and omental nodules are not always metastatic, and histopathological confirmation remains essential when deposits are encountered. In such situations, a helpful approach is to obtain targeted biopsies from representative sites for permanent section analysis, particularly when deposits are widespread[3,4,5], but the remainder of the abdomen appears uninvolved.

The etiology of such inflammatory peritoneal reactions associated with endometrial carcinoma remains incompletely interpreted. While the classic description involves keratin granulomas in tumors with squamous differentiation[10,11], our case demonstrated that non-specific inflammation—characterized histologically by a focal increase in inflammatory cells without granuloma formation or keratin debris— produced an identical macroscopic picture. This inflammatory response may be related to local tissue irritation (including postoperative/-foreign-material–related reaction) and, in some cases, an immune-mediated (hypersensitivity) mechanism[4,12]. Regardless of the precise mechanism, the clinical challenge is identical: the surgeon's visual assessment is unreliable for distinguishing these benign lesions from true metastatic implants.

The management pathway in this case demonstrates the application of risk-adapted approach, where treatment intensity was guided by the final pathology-confirmed stage and risk factors. Following the confirmation of Stage IA disease, adjuvant treatment was appropriately de-escalated to vaginal brachytherapy alone, rather than systemic therapy-[8,13,14]. The tumor board's recommendation for vaginal brachytherapy alone—based on the presence of Grade II histology and tumor necrosis—aligns with contemporary guidelines that avoid overtreatment in low-risk, early-stage disease. The patient's excellent long-term outcome, with no evidence of recurrence, even after four years, validates this tailored approach and confirms that the intraoperative findings were negative for an aggressive disease.

In conclusion, this case serves as a critical reminder for surgeons, oncologists, and pathologists. Benign peritoneal inflammatory reactions can be perfect macroscopic mimics of carcinomatosis. The definitive stage of endometrial cancer is a pathological, not a surgical, diagnosis. A disciplined reliance on histopathological confirmation of suspicious extra-uterine lesions is essential to avoid erroneous upstaging and the consequent cascade of overtreatment. Our patient had a excellent long-term outcome, with no evidence of recurrence over 50 months following surgery and tailored adjuvant brachytherapy, validates the multidisciplinary decision to forego systemic chemotherapy. This favorable course confirms that the inflammatory peritoneal reaction was a false mimic of aggressive biology and reinforces the principle that treatment intensity must be guided by pathological, not visual, staging. Heightened awareness of this entity ensures patients receive the most accurate prognosis and the most appropriate, evidence-based therapy.

CONCLUSION

Peritoneal deposits seen during surgery for endometrial carcinoma may resemble metastasis, yet they can be benign. Final staging should be based

on histopathology rather than operative appearance alone. In this case, peritoneal/omental sampling showed inflammatory changes without tumour, allowing accurate staging and appropriate adjuvant treatment. This underscores the importance of confirming suspected peritoneal disease on tissue diagnosis before changing management, to avoid overtreatment and ensure care is matched to the true extent of disease.

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Case Report

A Rare Case of Late Onset Isolated Hepatic Metastases from Laryngeal Carcinoma Demonstrated on PET-CT Scan – A Case Study

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ABSTRACT

Laryngeal cancer is the second most common type of head & neck malignancies. This cancer commonly spreads to regional lymph nodes and distant metastasis is rare. Liver metastasis rarely occurs without evidence of lung or bone involvement. We report a case with a history of squamous cell carcinoma of the larynx treated by definitive radiotherapy nine years earlier, had developed isolated liver metastases on 18F-fluoro-deoxy-D-glucose Positron Emission Tomography-Computed Tomography (FDG PET-CT).

Key words: *Fluorodeoxy D-glucose Positron Emission Tomography-Computed Tomography (FDG PET-CT), laryngeal cancer, liver metastasis.*

INTRODUCTION

Laryngeal cancer is the second most common variant of head & neck malignancies and the 14th most common malignancy in all cancers[1,2]. The most common histopathological type is squamous cell cancer (SCC)[2]. The overall incidence of distant metastases in laryngeal cancer is low. The lungs and bone are the most-frequent metastatic sites[3,4]. The lungs and bone are the most-frequent metastatic sites[4]. In this case report, we discuss a case of squamous cell carcinoma originating from the larynx, which had delayed hematogenous spread to the liver after nine years, without involvement of the lung or bone.

18F-FDG-PET-CT plays a crucial role in the management of laryngeal cancer, aiding in diagnosis and treatment planning. Despite initial aggressive treatment, local recurrence or distant metastases can occur in head and neck malignancies, especially within the 1st year[5]. Timely diagnosis of locoregional disease may improve survival by increasing the effectiveness of salvage therapy[6]. PET-CT imaging is superior to other conventional imaging in detection of local recurrence, as well as distant spread of disease[5]. The frequency of distant metastasis is relatively low in head and neck malignancies in comparison to other malignancies. Therefore, detection of distant metastases is an important factor in treatment planning[5].

In this case report, we present a patient with laryngeal SCC who developed isolated liver metastases after a prolonged disease-free interval.

CASE REPORT

A 68 years old male, diagnosed as a case of carcinoma of larynx since 2016. Histopathology report showed squamous cell carcinoma (diagnosed outside EHD). He was treated by radiotherapy, completed in 2016. Recently, he reported right upper abdominal pain for 1 week. Abdominal USG showed a large mass lesion in the liver, and the patient was referred to the Nuclear medicine & Molecular imaging department of Evercare Hospital Dhaka for an 18F-FDG-PET-CT scan for evaluation & re-staging the disease.

18F-FDG-PET-CT illustrated that there was a large hypermetabolic irregular heterogeneously enhancing mass with central necrosis in liver, predominantly in the right lobe, infiltrating porta hepatis and encasing portal vein and biliary duct, causing upstream biliary dilatation in left lobe. The mass measured about 12.6 cm (Tra) x 11.6 cm (AP) x 9.5 cm (CC). Another FDG avid heterogeneously enhancing mass was also seen in segment VII of liver (~4.8 cm x 3.4 cm x 2.4 cm. (Fig-1) On the other hand, there was no abnormal tracer uptake at the laryngeal region, lung, bone and cervical-mediastinal lymphatic groups. (Fig-2 & 3) CT guided biopsy of liver mass confirmed metastatic squamous cell carcinoma.

DISCUSSION

The frequency of distant metastases in laryngeal carcinoma is 8.5% - 20% [3,4]. However, one study mentioned that distant metastasis occurs in only 5% cases, because of improved initial proper treatment, which achieves locoregional control[7]. Advanced local disease (T3, T4), regional lymph node metastases at initial presentation (N+), tumor location and local tumour recurrence are related to distant metastases (3). In most cases, the tumors predominantly involve the lung (45–85%), followed by bones (10–30%) and liver (5–22%) [8,9,10].

Although liver metastasis is infrequently associated with advanced laryngeal cancer, its clinical presentation is often indolent during the course of disease. If symptoms are present, they will usually be nonspecific initially including anorexia, weight loss, and vague abdominal pain. However, during the natural course of the disease, other symptoms can alert the physician that either liver metastases are present or a patient is at high risk for liver metastasis. As stated above, advanced locoregional disease including regional lymph node metastasis is strongly associated with the risk for distant metastasis. In this case, the patient presented isolated liver metastases nine years after completion of treatment. The incidence of hematogenous spread to liver is very rare without evidence of pulmonary and bone disease[5]. Several reports of soft-tissue metastases from laryngeal cancer involving gluteus maximus and scapular muscles[5]. Another report that shows supraglottic larynx cancer which involves all five distal phalanges of the left hand while simultaneous involving lung and liver[11].

Most distant metastases are detected by the patients themselves or by specific symptoms[12]. For laryngeal cancer metastatic work-up, the standard involves direct laryngoscopy with biopsy, followed by imaging like contrast-enhanced computed tomography (CECT) and/or magnetic resonance imaging (MRI) for local staging or to check for lung/distant metastases, especially for advanced stages. In case of head and neck malignancies screening for distant metastases is currently not well established[13]. 18F-FDG-PET-CT has developed as a valuable imaging modality for staging, evaluation of treatment response and to detect local recurrence as well as distant metastases[14]. Many studies suggest that PET-CT is superior to other conventional imaging in primary staging and may alter management and treatment especially when unexpected nodal and/or distant metastasis is diagnosed[15,16].

The incidence of liver metastases in carcinoma of the larynx is relatively low but signifies hematogenous dissemination and poor prognosis. Therefore, detection of distant metastases is an important factor in clinical decision-making. This case illustrates a rare instance of liver metastasis, emphasizing the potential for atypical metastatic patterns. Long-term follow-up is essential for early detection of recurrence, monitoring treatment side effects,

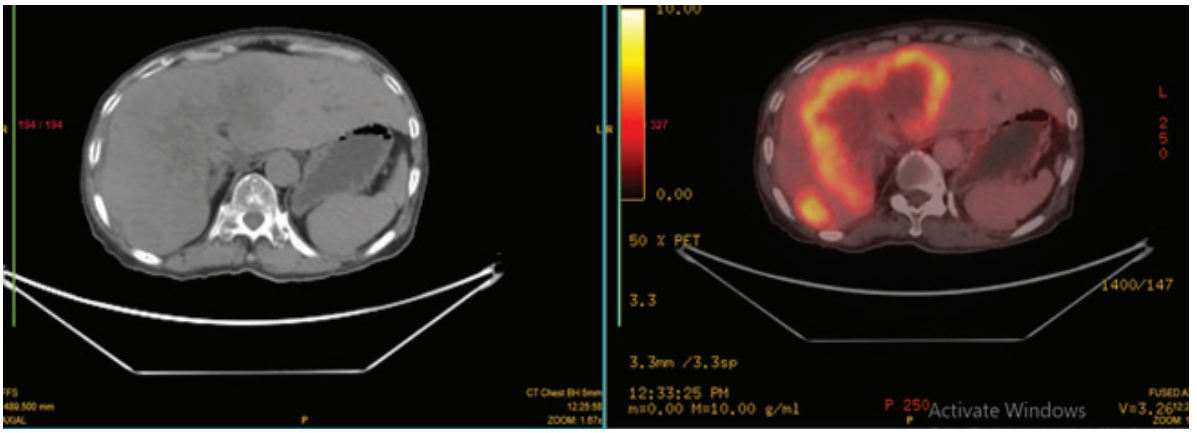

Figure 1: In axial scan, FDG avid large irregular heterogeneously enhancing mass with central necrosis is noted in liver, predominantly in right lobe, infiltrating porta hepatis and encasing portal vein & biliary duct, causing upstream biliary dilatation in left lobe. The mass measures about 12.6 cm (Tra) x 11.6 cm (AP) x 9.5 cm (CC) with SUVmax – 8.0. Another FDG avid heterogeneously enhancing mass is also seen in segment VII of liver (~4.8 cm x 3.4 cm x 2.4 cm).

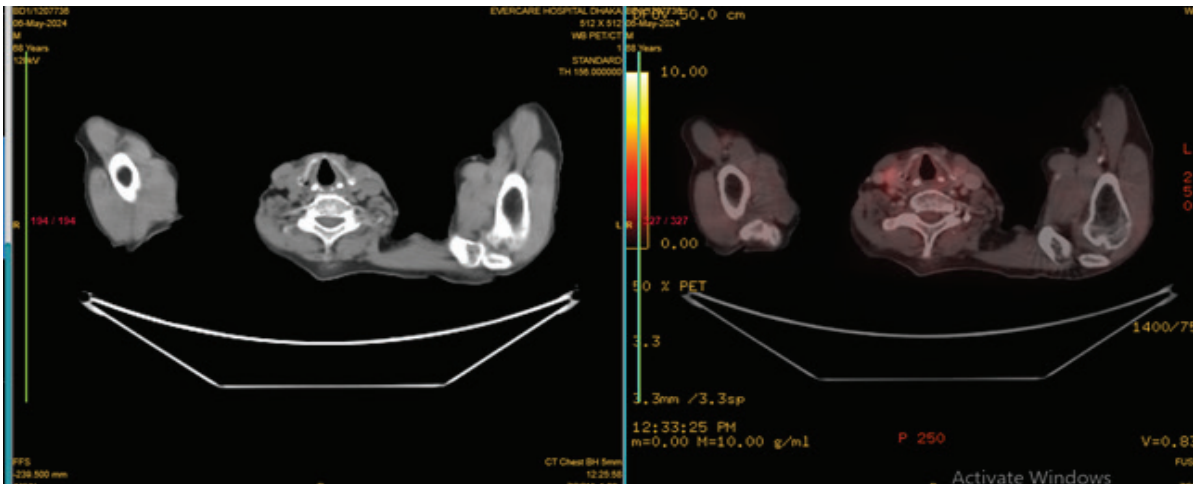

Figure 2: In axial scan, no abnormal FDG uptake is seen in larynx.

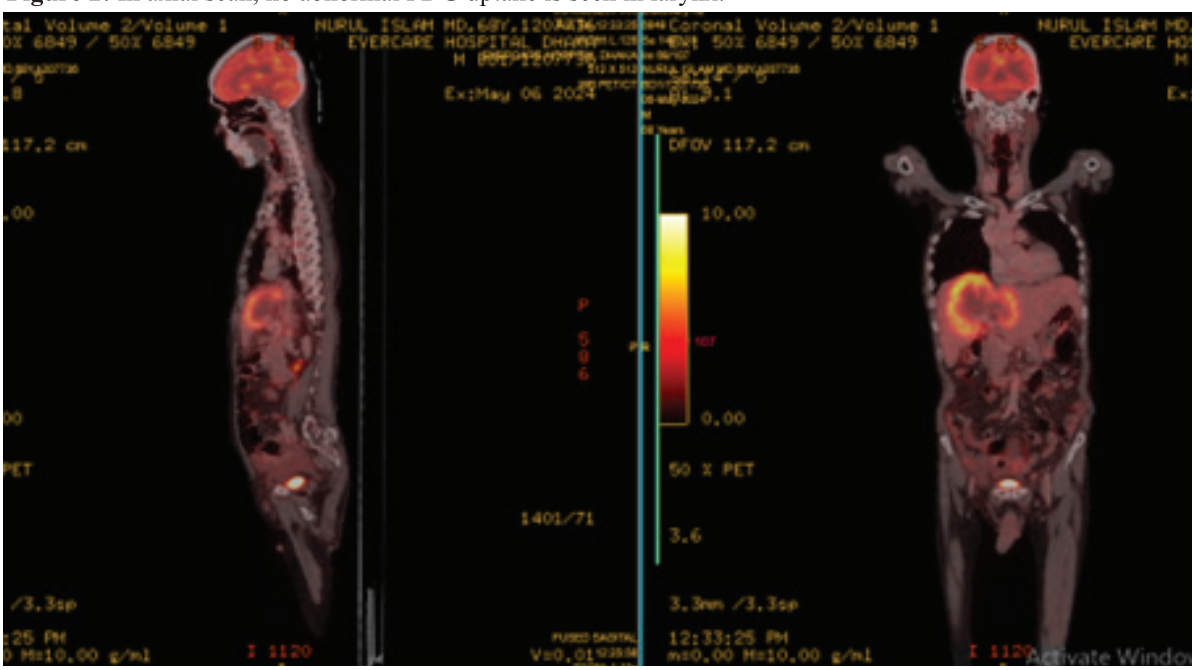

Figure 3: In sagittal and coronal scans show no abnormal FDG avidity in larynx. There is large high FDG avid mass is liver.

identifying second primary cancers and managing rehabilitation. Early and accurate detection of metastases may play an important role for patient survival. A whole-body 18F-FDG-PET-CT scanning is an essential method to re-stage the disease for further management planning.

The treatment modalities for laryngeal cancer are both surgery and radiotherapy[2]. In case of isolated SCC metastasis to the liver, several investigators have suggested using conformal radiation therapy or hepatic arterial infusion chemotherapy[17].

CONCLUSION

Delayed liver metastases from laryngeal carcinoma is rare but possible. Our patient presented with isolated liver metastases nine years after laryngeal cancer diagnosis. PET-CT plays a crucial role in identifying atypical metastatic patterns and guiding further management.

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Case Report

Simultaneous Occurrence of Beta Thalassemia Trait and Polycythemia Vera - A Case Report

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ABSTRACT

The coexistence of beta thalassemia trait (also known as heterozygous beta thalassemia, HBT) and polycythemia vera (PV) is extremely rare, with only a few cases reported in medical literature. This combined condition is significant because the two disorders have opposing effects on hemoglobin (Hb) and hematocrit (Hct), which can mask the presence of each other and delay diagnosis. Missing or delaying the diagnosis of PV can lead to deleterious effects due to the high risk of thrombosis. We present a case of an elderly male whose diagnosis of PV was delayed due to the coexistence of HBT and other comorbidities, and review the relevant literature.

Keywords: *Beta thalassemia trait, Polycythemia Vera, JAK2, Stress erythropoiesis.*

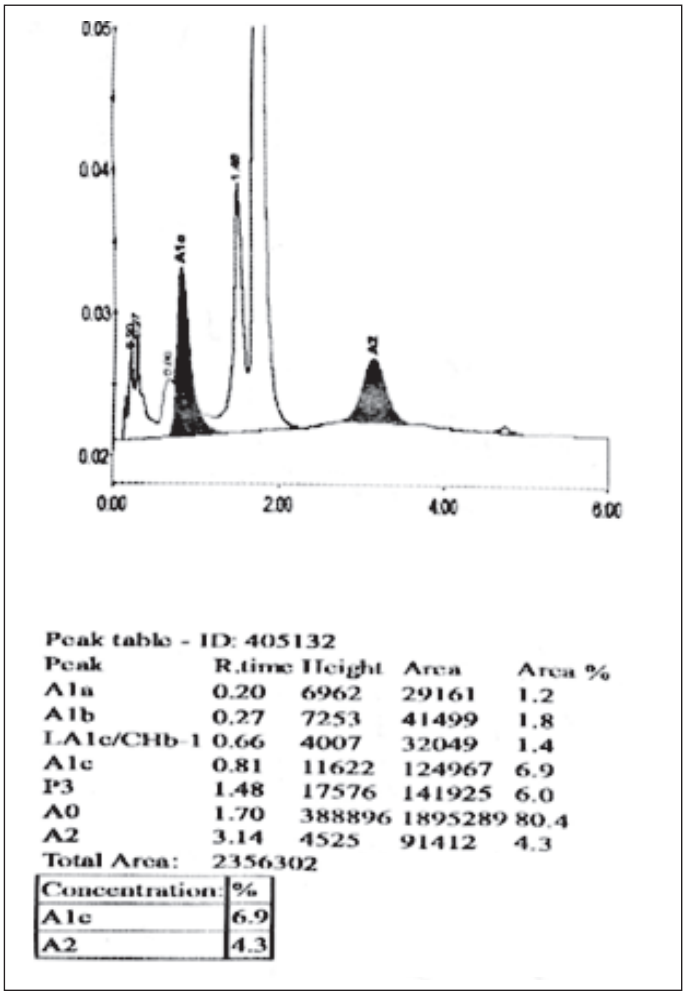
INTRODUCTION

Thalassemia is a group of inherited blood disorders caused by mutations in the globin gene, resulting in defective synthesis of one or more globin chains of hemoglobin (Hb). Alpha thalassemia is caused by deficient production of alpha globin, while beta thalassemia results from deficient production of the beta globin component of Hb. Beta thalassemia is common in the Mediterranean, the Middle East, and North Africa[1]. Beta thalassemia trait/minor manifests as mild anemia, asymptomatic, and does not require transfusion[2]. The complete blood count (CBC) in HBT typically shows microcytosis with erythrocytosis (largely due to stress erythropoiesis)[1]. The diagnosis of beta thalassemia is confirmed by finding an increased percentage of Hb A2 in Hb electrophoresis. Polycythemia vera is a myeloproliferative neoplasm characterized by erythrocytosis caused by the mutant JAK2 protein kinase[3]. It is associated with an increased risk of arterial and venous thromboses, especially in older patients and patients with coexistent cardiovascular risk factors[1]. There are a few case studies showing an association between HBT and PV. It is possible that chronic stress erythropoiesis due to beta thalassemia can lead to ineffective erythropoiesis and also increase the risk of JAK2 mutation[2]. We reviewed the literature regarding the coexistence of HBT and PV, and discussed the hypothesis of a causal relationship between the two conditions.

CASE PRESENTATION

78-year-old male, diabetic, hypertensive, CKD with a history of ischemic stroke, referred to Hematology OPD for persistent leukocytosis. He had mild dizziness and occasional vertigo. His CBC showed Hb 13.5 gm/dl, RBC count 8.0x1012/L, HCT 42.8%, MCV 53.5fl, WBC 32.65x109/L, neutrophils 49.6%, lymphocytes 21.8%, eosinophils 26%, and platelets 332x109/L. Iron profile & Hb electrophoresis were checked for microcytosis, which revealed Iron deficiency and beta thalassemia trait (HPLC showed HbA2 4.3% (normal range: 0-3.5%), Fig. 1). Family screening revealed his daughter also has beta thalassemia trait. Reactive causes of leukocyto-

sis and erythrocytosis were excluded. Normal hemoglobin level with erythrocytosis despite having iron deficiency and beta thalassemia trait raises the suspicion of Polycythemia Vera (PV). Myeloproliferative neoplasm (MPN) panel and Chronic Eosinophilic Leukemia (CEL) panel were done for the evaluation of erythrocytosis and leukocytosis with eosinophilia. The diagnosis of polycythemia vera was confirmed by identifying the JAK2 V617F mutation; the CEL panel was negative. Abdominal ultrasound showed no organomegaly. The patient was on low-dose aspirin and clopidogrel for his underlying conditions. Hydroxyurea



Peak table - ID: 405132

Peak	R.time	Height	Area	Area %
A1a	0.20	6962	29161	1.2
A1b	0.27	7253	41499	1.8
LA1c/CHb-1	0.66	4007	32049	1.4
A1c	0.81	11622	124967	6.9
P3	1.48	17576	141925	6.0
A0	1.70	388896	1895289	80.4
A2	3.14	4525	91412	4.3
Total Area:			2356302	

Concentration:	%
A1c	6.9
A2	4.3

Figure 1: HPLC shows HbA2 4.3%

was added. On regular follow-up, he showed a good response to HU and low-dose Aspirin. On his last follow-up (8 months after initiation of HU), CBC showed Hb 12.2 gm/dl, RBC 4.4x1012/L, Hct 38.3%, MCV 86fl, WBC 10.46x109/L, neutrophils 53%, lymphocytes 30%, eosinophils 11%, and platelets 160x109/L.

DISSCUSSION

Beta thalassemia is characterized by a decreased production of the beta subunit of Hb[1]. Phenotypically, it is of three types: thalassemia major, thalassemia intermedia, and thalassemia minor/trait. Beta thalassemia major is usually diagnosed during the first two years of life, and these patients are transfusion dependent. Beta thalassemia intermedia presents later and does not require regular blood transfusions. Beta thalassemia trait causes mild or asymptomatic anemia, rarely requiring transfusion or any treatment[1].

Paterakis et al. showed that individuals with HBT had significantly higher reticulocyte counts, which were proportional to the degree of anemia[4]. This statement is in agreement with the findings of Vedovato et al., who found that levels of serum Erythropoietin (Epo) were higher in HBT subjects than in normal controls[5]. It can be postulated that higher levels of Epo result in increased stimulation of the EpoR/JAK2/STAT signaling pathway, thus increasing the probability of JAK2 mutations[5].

In the present case, the patient is a case of beta thalassemia trait and polycythemia vera (JAK2 mutation positive). Polycythemia vera is a myeloproliferative neoplasm caused by a mutation in JAK2 (95% cases), which leads to an uncontrolled, neoplastic proliferation of hematopoietic stem cells. This leads to an increase in the proliferation of RBCs with a secondary increase in WBCs and platelets due to simultaneous stimulation of these cell lines. The presenting feature includes headache, vertigo, dizziness, claudication, thrombosis, itching, and visual disturbances as a result of the increased viscosity of blood4. Few case studies showed an association between beta thalassemia and polycythemia vera[6].

A list of the literature showing cases of HBT with PV is shown in Table 1[1,7-11]. A patient with beta thalassemia trait who suddenly experiences a rise in

	present case	Khan AA[2]	Kontas K[1]	De Sloovere et al.[7]	Lopes da Silva and Silva[8]	Ifran et al.[9]	Thomas[10]	Castro[11]
Age	78	70	84	60	75	68	71	48
Gender	M	M	F	F	F	F	F	F
Hyperviscosity	Yes	No	Yes	Yes	No	Yes	Yes	No
Splenomegaly	No	No	No	Yes	Yes	Yes	No	Yes
RBC (x10^{12}/L)	8.0	6.0	7.0	10.5	9.0	9.3	7.4	8.0
Hb (g/dl)	13.5	14.8	15.8	19.8	15.4	15.5	15.6	14.4
Hct (%)	42.5	44.7	50.4	58.6	51.8	59.0	48.1	42.0
MCV (fl)	53.5	63.7	69.0	56	59.2	NA	65	70
HbA2 (%)	4.3	5.3	3.8	4.1	4.3	4.7	5.5	4.9*
EPO	ND	Low	Low	Low	Low	Low	Low	ND
JAK2 mutation	Yes	Yes	Yes	Yes	Yes	ND	ND	ND
Treatment given	Aspirin HU	Aspirin HU	Aspirin HU	Aspirin HU	Aspirin HU	Phlebotomy	Phlebotomy	Busulfan Phlebotomy Mustard

Table1: Clinical and laboratory parameters of the reported cases of co-occurrence of HBT and PV

* The patient was heterozygous for both beta thalassemia and sickle cell disease.
RBC: red blood cell; Hb: hemoglobin; Hct: hematocrit; MCV: mean corpuscular volume; EPO: erythropoietin; NA: not available; ND: not done; HU: Hydroxyurea; HBT: heterozygous beta thalassemia; PV: polycythemia vera

hemoglobin and hematocrit levels should have a differential diagnosis of myeloproliferative neoplasm.

Iron deficiency is found in most of the polycythemia patients, either at diagnosis or during the course of the disease[12]. Reasons include overutilization of iron by the hyperplastic erythropoiesis, blood loss from the gastrointestinal tract, and or therapeutic venesection[12]. Our patient is also having an iron deficiency, likely due to hyperplastic erythropoiesis.

There are no published data regarding the prevalence of JAK2 mutations in HBT. Studies showed conflicting results: Taher et al. did not find the JAK2 V617F mutation in any of the 36 Lebanese thalassemia intermedia patients[13]. Similarly, Vlachaki et al. detected no JAK2 V617F mutation in 20 Greek beta thalassemia patients[6]. On the contrary, Asadi et al. have detected this mutation in 19% of patients with beta thalassemia major[14]. Interestingly, most of the HBT patients who developed PV were female. This statement is supported by the findings of Vedovato et al., who observed that women with HBT had significantly higher levels of serum Epo than men with HBT[5]. All of these findings suggest that a causal relationship between HBT and PV is possible. More prospective studies are needed to find out the correlation between HBT and PV.

CONCLUSION

Polycythemia vera coexisting with Beta Thalassemia Trait may elude diagnosis for a considerable time due to the masking effect of one another, exposing the patient to the risk of serious complications, including fatal thrombotic complications. Timely diagnosis of PV in this population requires a high index of suspicion (sudden increase in Hb and Hct level in beta thalassemia patients) and a low threshold for investigation, including search for JAK2 mutations. The prevalence of the latter in individuals with HBT, and vice versa, should be the subject of future research.

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Case Report

A_2B with Clinically Significant Anti-A_1 : A Case Report on the Incidental Finding

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ABSTRACT

The purpose of this article is to report an incidental finding of a clinically significant anti-A1 antibody while detecting blood group of an elderly patient. As this antibody is reactive at 37□, this may cause destruction of transfused A1 red cells and this is the cause of clinical significance. Usually anti-A1 antibodies in plasma are naturally occurring antibodies, not clinically significant because they react best below room temperature, not at body temperature sometimes causing discrepancy during routine blood grouping and crossmatching. For this particular case, some precautions should be taken before blood transfusion to avoid hemolysis.

Keywords: *ABO blood group, Rh typing, Agglutination reaction*

INTRODUCTION

As of October 2024, the International Society of Blood Transfusion (ISBT) has recognized 47 blood group systems containing 366 red cell antigens[1]. Four main blood groups; A, B, AB and O are enlisted in ABO system, which was discovered in 1900 by Karl Landsteiner, an Austrian-American biologist, physician and immunologist. The ABO blood group is determined by the presence or absence of an antigen on red cell membrane and the absence or presence of a corresponding antibody in plasma[2]. The expression of ABO antigen is controlled by three separate genetic loci[3]. Numerous mutations are found in A, B and O genes, but the most common mutation is A_2. The A_2 gene has two nucleotide different from the A_1 gene which results in diminished enzymatic activity and consequently, weakened antigen expression[4].

Distinction between A_1 & A_2 made by testing red cells with the lectin from Dolichos biflorus[5]. Typically blood group AB individuals express both A and B enzymes and carry both antigens on their RBCs. Because the A and B glycosyltransferases are not 100% efficient, blood group A, B, and AB individuals also express some H antigen[6]. The relative amounts of H antigen are found in the following sequence of phenotypes: O > A_2 > B > A_2B > A_1 > A_1B > Para-Bombay > Bombay[7]. This H antigen can be detected by testing red cell with anti-H lectin which is commercially available.

The incidence of ABO groups varies very markedly in different parts of the world and among different races[8]. Anti-A and anti-B are usually detectable within 3 to 6 months after birth[9]. At the age of 5 years, the titer of anti-A and anti-B antibodies reaches a maximum and persists throughout adulthood. The titer of IgM anti-A and anti-B antibodies may gradually decline with advanced age[10]. The frequency of the common A subgroups varies greatly among different populations. In A and AB blood groups among Caucasian population, approximately 80% are A_1 or A_1B and 20% are A_2 or A_2B[11,12].

According to an Indian study report, the frequency of A_1 and A_2 subgroups, among A blood group was 98.14% and 1.07%, respectively whereas, in AB blood group, the frequency of A_1B was 89.28% and that of A_2B was 8.99%. This report describes the proportion of A_2B among AB blood group as significantly higher than that of A_2, in group A blood group[13] and approximately the same distribution is obtained by Bangera[14].

CASE REPORT

A 78 year old male, diagnosed case of β thalassaemia trait, who has never received any blood transfusion came to check his blood group as part of routine investigations. For ABO grouping and RhD typing, 3ml blood sample in an EDTA tube was received in the Transfusion Medicine Department. Red cell and plasma were separated by centrifugation at 4000 rpm using a tabletop centrifuge machine. A 3% cell suspension was prepared from the washed red cells of the patient. Reagent A cell, B cell and O cell were prepared from in-house pooled A cell, B cell and O cell. Blood grouping was done by both the column agglutination method using Ortho BioVue ABD forward and reverse cassettes and conventional slide tests. Forward grouping revealed AB blood group whereas reverse grouping showed B blood group (due to agglutination with A cell which was an unexpected reaction). Reaction pattern is shown in the Table 1

Table 1 : Blood Group in Column Agglutination Technology

Anti-A	Anti-B	Anti-D	O cell	A cell	B cell
+	+	+	-	+	-

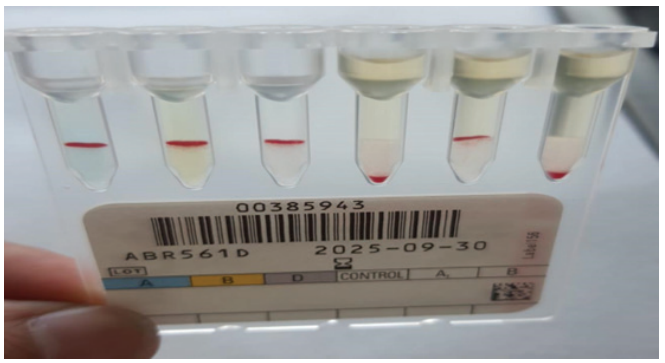

Figure : Blood Group in Column Agglutination Technology

Without solving this ABO discrepancy, blood group could not be confirmed. Patient's sample and identification, possible contamination in pooled cells used for reverse grouping as well as lot number and expiration date of gel card; all were rechecked. Repeat blood grouping both forward (testing patient's cell with reagent) and reverse (testing patient's plasma with in house prepared A cell, B cell and o cell) by traditional test tube method at 4ºC, room temperature (22-25ºC) and 37ºC showed similar results.

Table 2 : Blood group at different temperatures

	Anti-A	Anti-B	Anti-AB	Auto control	Anti-D	A cell	B cell	O cell
At 4ºC	+	+	+	neg	+	+	neg	neg
At 22-25ºC	+	+	+	neg	+	+	neg	neg
At 37ºC	+	+	+	neg	+	+	neg	neg

On further testing with anti-A1 lectin, no agglutination reaction was observed. As there was no agglutination reaction with anti-A1 lectin, his ABO blood group was confirmed as A_2B which is a subgroup of AB blood group. Reaction with anti-H lectin showed positive reaction.

However, to exclude any chance of possible hemolytic transfusion reaction upon blood transfusion if required at any time, thermal amplitude of anti-A1 antibody was checked at 4°C, 22-25°C and 37°C temperature. To see the strength of the agglutination reaction, titration was done by double dilution method after a serial dilution of serum (1:1, 1:2, 1:4, 1:8, 1:16, 1:32, 1:64, 1:128….). Antibody titre obtained was 1:32 at 37°C and 1:64 at both 4°C and 22-25°C. The presence of this anti-A_1 antibody was marked as clinically significant as it was reactive at 37°C. Family history of this patient could not be obtained.

DISCUSSION

A_1 and A_2 are the most common sub-types of A blood group. Other less prevalent sub-types are A_3, A_x, A_{el}, Aend. Individuals with A_1 sub-type express A_a, A_b, A_c and Ad antigenic determinants, whereas A_2 sub type have only A_a and A_b antigenic determinants. Absence of A_c and A_d determinants is assumed to be the cause of anti-A_1 antibody development in A_2 sub-type[15]. Approximately 0.4% of A_2 and 25% of A_2B individuals possess anti-A_1 antibody which is naturally occurring IgM cold antibody, reacts best below room temperature, causing discrepancy in blood grouping but does not cause any transfusion reaction[16]. However, in some cases this anti-A^1 antibody is reactive at 37ºC and

can cause hemolytic transfusion reaction if A_1 cell is transfused[17,18].

In this particular case, thermal amplitude of this anti-A_1 antibody is very wide (4- 37ºC). Reactivity at 37ºC temperature is the cause of clinical significance as it may cause hemolysis if A_1B cells are transfused to this individual. This patient was advised to accordingly that if blood transfusion is required at any time, A_2B blood group should be selected as well as crossmatching by IAT(Indirect Antiglobulin Test) method is a must. As it is very difficult to find out a donor of A_2B blood group, PRBC of O blood group and plasma or plasma components from AB blood group can be transfused.

CONCLUSION

In addition to standard ABO and Rh typing, extended antigen typing may be needed. It is also advisable to perform an antibody screen along with their thermal amplitude on the recipient's sample prior to blood transfusion, allowing for the selection of corresponding antigen-negative blood products when necessary. Furthermore, maintaining accurate records of patient's antibody history and transfusion reactions can help improve safety protocols and guide healthcare providers in making informed transfusion decisions. Continued education and training for staff involved in blood transfusion practices are imperative to ensure adherence to guidelines and to minimize the potential for adverse events.

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Case Report

A Large Duodenal Adenoma Causing Significant Bleeding Successfully Removed by Endoscopic Measure - Case Report

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ABSTRACT

BACKGROUND: Brunner's gland adenoma is a rare benign tumor arising from the submucosal glands of the duodenum. Most lesions are small and asymptomatic, but larger tumors may present with gastrointestinal bleeding, anemia, or obstruction. Lesions located in the distal duodenum may be difficult to detect with conventional endoscopy

CASE PRESENTATION: A 67-year-old man with hypertension and diabetes presented with recurrent melena for two years, worsening over the previous two months. Prior evaluations, including esophagogastroduodenoscopy, side-viewing endoscopy, and colonoscopy, failed to identify the bleeding source. He was found to have severe iron deficiency anemia (hemoglobin 7.2 g/dL). Contrast-enhanced CT revealed an intraluminal lesion in the third part of the duodenum. Further evaluation using a pediatric colonoscope enabled deeper duodenal intubation and identified a large bleeding pedunculated polyp in the second part of the duodenum. Endoscopic treatment with adrenaline injection, hemoclip placement, and snare polypectomy was successfully performed. The resected polyp measured 5.5 cm, and histopathology confirmed Brunner's gland adenoma. The patient recovered uneventfully with resolution of bleeding and improvement in hemoglobin levels.

CONCLUSION: Brunner's gland adenoma should be considered in patients with unexplained recurrent upper gastrointestinal bleeding and iron deficiency anemia when routine endoscopy is inconclusive. Advanced endoscopic techniques allowing deeper duodenal examination can facilitate diagnosis, and endoscopic resection provides effective definitive treatment.

Keywords: *Brunner's gland adenoma, duodenal polyp, endoscopic polypectomy, upper gastrointestinal bleeding, iron deficiency anemia.*

INTRODUCTION

Brunner's gland adenoma is a rare benign proliferative lesion arising from Brunner's glands of the duodenum, accounting for about 10% of duodenal tumours with an estimated incidence of 0.008%[1]. These lesions are typically small, sessile, and asymptomatic, and are often detected incidentally during upper gastrointestinal endoscopy[2]. However, larger lesions particularly pedunculated polyps may present with clinically significant manifestations such as upper gastrointestinal bleeding, Iron deficiency anaemia, intestinal obstruction, or, rarely, pancreatobiliary complications when located near the ampulla of Vater[3].

Chronic or recurrent melena in elderly patients is most commonly attributed to peptic ulcer disease, erosive gastritis, vascular ectasia, or malignancy. Rare aetiologies such as Brunner's gland adenoma may be overlooked, especially when initial endoscopic findings reveal nonspecific abnormalities such as gastric erosions or ampullary prominence. Lesions located in the second or third portion of the duodenum may be difficult to detect with a standard forward-viewing gastroscope, potentially delaying diagnosis and definitive treatment[4].

Endoscopic resection has emerged as the preferred therapeutic approach for symptomatic Brunner's gland adenomas, providing both histopathological confirmation and definitive management with lower morbidity compared to surgical excision[5]. Early recognition is essential to prevent recurrent bleeding and transfusion dependency.

Herein, we report a case of recurrent overt gastrointestinal bleeding in an elderly patient ultimately diagnosed with a large pedunculated Brunner's

gland adenoma in the second part of the duodenum, successfully managed using advanced endoscopic techniques after multiple inconclusive evaluations.

CASE REPORT

A 67-year-old, hypertensive diabetic patient, father of a government service holder physician, complained of on and off passage of black tarry stool for about 2 years, frequency increased for last 2 months. Initial laboratory evaluation performed at a local facility revealed a haemoglobin level of 7.5 g/dL, for which he received one unit of packed red blood cells (PRBC).

Because of ongoing melena, patient underwent EGD in another hospital, which revealed only swollen prominent ampulla without any source of bleeding. Since the patient was having persistent melena, a Lateral View Endoscopy of Upper GI and Colonoscopy were done after 1 month in the same hospital but exact bleeding lesion could not be identified. Oral PPI was prescribed and advised for observation.

Later melena continued and was referred to Evercare Hospital Gastroenterology OPD. The patient was admitted under Dept. of Gastroenterology for further evaluation and management.
On admission, patient's Hemoglobin was found to be 7.2 gm/dL. Iron Profile report showed: Tsat – 11.7%. He received 1 unit PRBC and Inj. Ferric carboxy Maltose 1gm. CT scan of Upper Abdomen with contrast was done which showed: Intraluminal soft tissue density within third part of duodenum.

Afterwards, EGD with normal upper GI scope and Side viewing Endoscope was done, but exact nature and origin of the big polypoid lesion at 2nd part of duodenum could not be ascertained. Then EGD was done by Paediatric Colonoscope and meticulous searching done up to proximal jejunum. Then a huge sized pedunculated polyp found at 2nd part of duodenum with active bleeding from the surface (Fig 1). Injection Adrenaline was injected at the base of the pedicle of the polyp. Two hemoclips applied at the pedicle (Fig 2). Later polyp was removed by snare technique very technically (Fig 3). Six hemoclips applied at the polypectomy site and hemostasis ensured. The excised polyp was of 5.5 cm size as measured by calibrating scale(Fig 4).

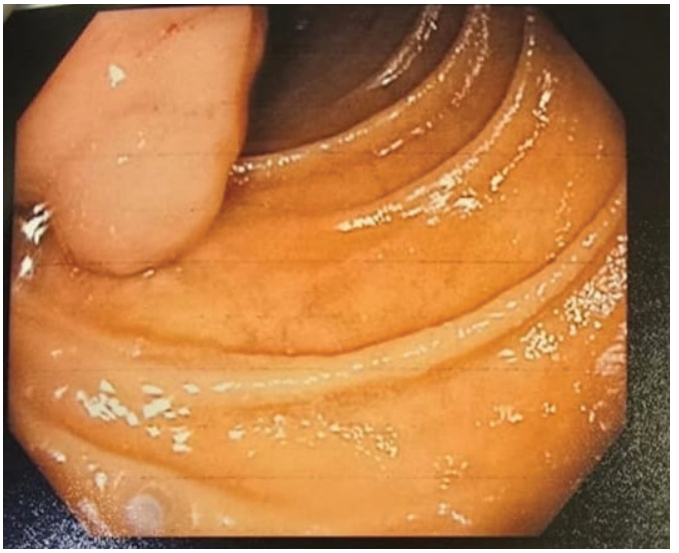

Figure 1: A huge sized pedunculated polyp detected at 2nd part of Duodenum

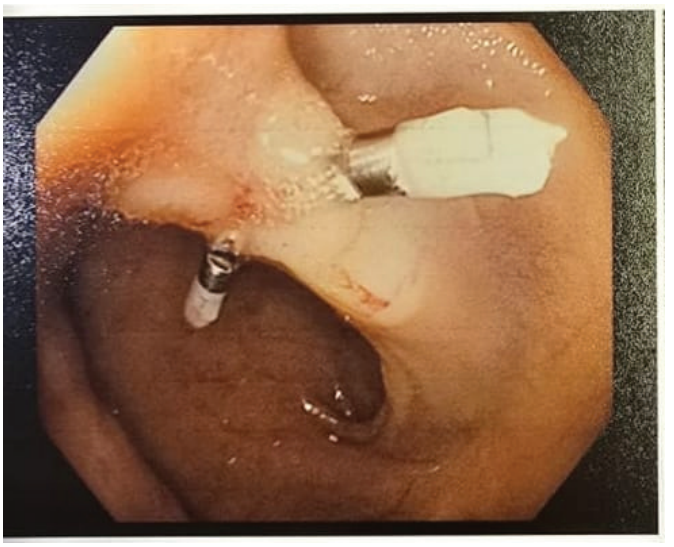

Figure 2: Inj. Adrenalin injected at pedicle of the polyp and hemoclips applied

Polypectomy sample was sent for Histopathological examination. Histopathological examination was suggestive of Brunner's gland adenoma.

The patient had an uneventful recovery and was discharged from the hospital after three days after the procedure with a hemoglobin level of 10.8 g/dL. The patient came to follow-up in OPD after 7 days and gave no further history of melena after

discharge from Evercare Hospital Dhaka. CBC done on the previous day of OPD visit showed Hemoglobin was 12.1 gm/dL.

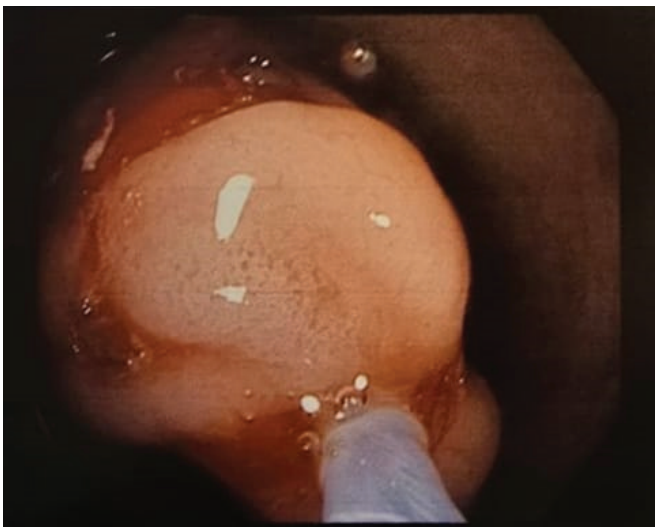

Figure 3: Polyp being excised by Snare technique

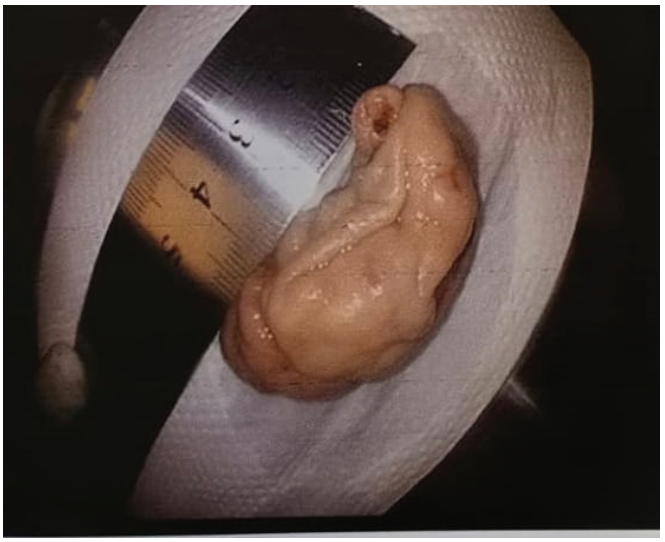

Figure 4: Size of polyp measured by calibrating scale after excision and remova

DISCUSSION

Brunner's gland adenoma is an uncommon benign lesion arising from the submucosal Brunner's glands, predominantly located in the proximal duodenum. Although most lesions are small and asymptomatic, those exceeding 2 cm are more likely to become clinically significant and symptomatic 6. Gastrointestinal bleeding is one of the most frequent presentations of large Brunner's gland adenomas and may manifest as chronic iron deficiency anemia or overt melena, as observed in our patient [7].

The pathogenesis of Brunner's gland adenoma remains incompletely understood. Proposed mechanisms include chronic mucosal irritation, hyperchlorhydria, and Helicobacter pylori–associated inflammation, which may stimulate glandular hyperplasia[8]. However, the causal relationship remains controversial, and eradication of H. pylori does not necessarily prevent recurrence or progression of established lesions, as illustrated in this case. Diagnosis can be challenging, particularly when lesions are located in the second or third part of the duodenum. Standard forward-viewing Esophagogastroduodenoscopy (EGD) may fail to adequately visualize periampullary or distal duodenal lesions, especially if they are pedunculated and mobile[9]. In our case, multiple endoscopic evaluations, including side-viewing endoscopy, were required before the lesion was fully characterized using a pediatric colonoscope with deeper intubation.

Cross-sectional imaging such as CT scan and MRCP may demonstrate intraluminal soft tissue density but often lacks specificity for definitive characterization[9].

Histologically, Brunner's gland adenoma is characterized by lobulated proliferation of normal Brunner's glands separated by fibromuscular stroma, without cytological atypia. Malignant transformation is exceedingly rare but has been reported in isolated cases[10], underscoring the importance of complete excision and histopathological evaluation. Endoscopic resection is currently considered the treatment of choice for symptomatic or large lesions. Techniques include snare polypectomy, endoscopic mucosal resection (EMR), and, in selected cases, endoscopic submucosal dissection (ESD)[11]. Pedunculated lesions are particularly amenable to snare polypectomy with prior adrenaline injection and prophylactic hemoclip application to minimize bleeding risk. In our patient, successful endoscopic removal with haemostatic clip placement resulted in complete resolution of bleeding and correction of anaemia, thereby avoiding surgi-

cal intervention. Surgical resection is now reserved for giant lesions, sessile masses not amenable to endoscopic therapy, or when malignancy cannot be excluded[11].

This case highlights the importance of maintaining a high index of suspicion for rare duodenal lesions in patients with recurrent unexplained upper gastrointestinal bleeding, particularly when initial endoscopic findings are inconclusive.

CONCLUSION

Brunner's gland adenoma, though rare, should be considered in the differential diagnosis of recurrent melena and unexplained Iron deficiency anaemia, especially when routine endoscopic evaluation fails to identify a definitive bleeding source. Lesions located in the distal duodenum may require advanced endoscopic techniques for accurate visualization and diagnosis. Endoscopic resection is safe, effective, and curative in most cases, providing both definitive diagnosis and therapeutic management. Early recognition and appropriate endoscopic intervention can prevent recurrent bleeding, repeated transfusions, and unnecessary surgical procedures.

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Sl.	Department	Date	Topic	Speaker	Expert Discussants
1	Pediatrics & Neonatology	30/09/2025	Update on Immunization in Children	• Dr. Najia Ferdoush Associate Consultant Department of Paediatrics Evercare Hospital Dhaka • Prof. Dr. M. Istiaque Hossain Senior Consultant Department of Paediatrics & Neonatology Evercare Hospital Dhaka	Prof. Dr. M. Istiaque Hossain Senior Consultant Department of Paediatrics & Neonatology Evercare Hospital Dhaka
2	Opthalmology	08/10/2025	Anti-Vascular Endothelial Growth Factor (ANTI-VEGF) in EYE/Ophthalmology	• Prof. Dr. Sheikh Mahbub-Us Sobhan Senior Consultant Department of Ophthalmology Evercare Hospital Dhaka • Prof. Dr. Nazmun Nahar Senior Consultant Department of Ophthalmology Evercare Hospital Dhaka	Prof. Dr. M. Istiaque Hossain Senior Consultant Department of Paediatrics & Neonatology Evercare Hospital Dhaka
3	Neurology	29/10/2025	Hyperacute Stroke what we are doing now! Intervention in Hyperacute Stroke Stroke Microsurgery	Dr. Abrar Bin Ahsan Resident Medical Officer Neurology Evercare Hospital Dhaka Associate Prof. Dr. Sirajee Shafiqul Islam Department of Neurology National Institute of Neuroscience & Hospital Dhaka Dr. Syeda Neyamot-E-Ferdousse Department of Neurosurgery National Institute of Neuroscience & Hospital, Dhaka	Prof. Dr. Abdul Kader Shaikh Senior Consultant & Coordinator Neurology Evercare Hospital Dhaka Prof. Dr. Md. Zillur Rahman Senior Consultant & Coordinator Neurosurgery Evercare Hospital Dhaka Dr. Khandker Mahbubar Rahman Senior Consultant Neurology Evercare Hospital Dhaka Prof / Brig Gen Syed Zoherul Alam Senior Consultant Interventional Radiology Evercare Hospital Dhaka
4	DMS Office	17/11/2025	Hyperbaric Oxygen Therapy (HBOT)	Edward A. Betts Co-Founder & Executive Director – ANDI International Co-Founder & Technical Advisor – Hyperbaric SAC New York, USA	Prof. Dr. M. Istiaque Hossain Senior Consultant Department of Paediatrics & Neonatology Evercare Hospital Dhaka

Sl.	Department	Date	Topic	Speaker	Expert Discussants
5	Infection Control	24/11/2025	World Anti-Microbial Resistance (AMR) Awareness Week 2025	Dr. Nikhat Ara Senior Consultant Department of Microbiology Lab & Infection Control Evercare Hospital Dhaka	• Brig. Gen. (Rtd) Prof. Dr. Md. Mahbub Noor Senior Consultant & Coordinator–Department of Medical ICU • Dr. M. Quamrul Hassan Senior Consultant Department of Pediatrics & Neonatology & Coordinator-Pediatric ICU • Dr. Nikhat Shahla Afsar Senior Consultant & Coordinator Department of Internal Medicine Evercare Hospital Dhaka
6	PICU	11/12/2025	Newer Antibiotics need rational use	Dr. Tangina Alam Senior Specialist Pediatric ICU Evercare Hospital Dhaka	• Prof. Dr. Sheikh Mohammad Abu Zafar Senior Consultant Department of Gen & Lap. Surgery Evercare Hospital Dhaka • Dr. Borhan Uddin Ahmad Senior Consultant Department of Internal Medicine Evercare Hospital Dhaka • Dr. Muhammad Lutful Latif Chowdhury Senior Consultant & Coordinator Department of Gastroenterology Evercare Hospital Dhaka • Dr. M. Quamrul Hassan Senior Consultant Department of Pediatrics & Neonatology & Coordinator-Pediatric ICU Evercare Hospital Dhaka • Dr. Nurun Naher Consultant Department of Pediatric ICU Evercare Hospital Dhaka

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Manuscript preparation: The editorial board has decided to comply with "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" published by the International Committee of Medical Journal Editors in Vancouver, British Columbia in 1979 (the widely accepted "Vancouver style")' published in the Annals of Internal Medicine 1982;96:766-71.

- Original articles, reviews, special articles, case reports, and any other articles of medical interest are welcome.
- Should be typed in English on A4 (290 x 210cm) size paper, using Times new roman font, size 12, with double space in all portions. Italic instead of underlying will be more preferred except URL references.
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  - Abstract (should include background, objective, methodology, results, the conclusion in short) with keywords
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  - Acknowledgments
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  - All scientific units should be expressed in System International (SI) units.
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Example: Lee EJ, Kim JH, Park ES, Kim YH, Lee JK, Hong SH et al. A novel weighted scoring system for estimating the risk of rapid growth in untreated intracranial meningiomas. J Neurosurg. 2017 Nov;127(5):971-980.

- References from books must include Author, Book title, Subtitle, Publisher, Publisher location and Year.
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Example: Gaillard, F., Luong, D. Meningioma. Reference article, Radiopaedia.org; 2008May. (Accessed on 24 Feb 2022) available from: https://radiopaedia.org/articles/meningioma?lang=us

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- The manuscripts should be submitted to the editor/ executive editors with a covering letter, mention ing that the work has not been published or submit ted for publication anywhere else.
- Authors should mail the article to the designated email address or to editor in chief.
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Embracing Robotic Assisted Surgery: A New Chapter for Healthcare in Bangladesh. The Opportunity We Shape Carefully

"True medical innovation lies not only in adopting new technologies, but in ensuring they meaningfully improve care where it is needed most."

Robotic Assisted Surgery is often framed as a luxury technology—impressive and expensive. For low- and middle-income countries like Bangladesh, it has long felt distant from everyday clinical reality—until recently. Today s used in many types of operations, including cardiothoracic, colorectal, general, orthopedic, gynecology, and head-and-neck surgery.

Among neighboring countries, India is already performing about 12,000 robotic surgeries annually with more than 500 trained surgeons. Pakistan's Pakistan Kidney and Liver Institute (PKLI) alone has crossed 500 cases, and Nepal installed its first surgical robot in 2024. In Bangladesh, the National Institute of Cardiovascular Diseases (NICVD) performed the country's first robotic-assisted coronary stenting using a trial system in January 2024. Meanwhile, major private hospitals—including Evercare—have applied for approval to install full robotic surgical systems.

Current clinical research and global market trends indicate that Robotic Assisted Surgery is systematically replacing traditional endoscopic and laparoscopic methods, particularly for complex and deep-seated procedures. Evidence from systematic reviews suggests that robotic platforms may reduce conversion to open surgery in selected procedures. For example, in rectal cancer surgery, conversion rates have been reported as low as 3.2% with robotic surgery compared with 14.7% for laparoscopy in some analyses. These superior outcomes are driven by the integration of artificial intelligence, which can help identify critical anatomical structures and guide surgeons during procedures, reducing the risk of inadvertent injury to healthy tissue. In addition, robotic bronchoscopy is instituting "see-and-treat" capabilities, where lesions can be identified, biopsied, and treated in the same session, potentially reducing the need for additional procedures. At the same time, robotic systems may offer ergonomic advantages for surgeons by allowing procedures to be performed in a seated, more controlled environment, potentially reducing the physical strain associated with long operations. Nonetheless, Robotic technology also creates opportunities for tele-mentoring and tele-surgery, allowing surgical expertise to be transmitted across distances without the need for physical travel.

Patient benefits remain central to the increasing adoption of robotic surgery. Compared with conventional open procedures, robotic approaches are often associated with smaller incisions, reduced blood loss, less postoperative pain, and faster recovery, allowing many patients to return home earlier and resume normal activities sooner. In cardiac and thoracic surgery, studies have shown shorter hospital stays, reduced intensive care use, and lower transfusion requirements. Offering such advanced surgical options locally—closer to patients' homes— also reduces the financial and emotional burden families often face when seeking treatment abroad. From a public health perspective, these advantages are particularly meaningful.

Yet we must stay grounded, our ambition to introduce Robotic Assisted Surgery must be guided by thoughtful realism. The initial installation cost—often exceeding Tk 20 crore—along with ongoing expenses for specialized disposable instruments, represents a major investment. As a result, robotic platforms often provide the greatest value in complex procedures- where improved precision, fewer complications, and shorter ICU stays may help to offset the costs. In resource-limited healthcare systems, it is essential that such

technologies ultimately lead to better patient outcomes, greater efficiency, and improved access to care.

Evercare Hospital's upcoming Robotics launch program should therefore be viewed not merely as a technological upgrade, but as a responsibility—to build a sustainable program supported by robust training pathways, outcome monitoring, and a deliberate access strategy. In the best version of this story, such a center could evolve into a national hub for education, research, and advanced clinical capability.
In conclusion, Robotics will not replace surgical judgment or human care. But if implemented with discipline, foresight, and equity in mind, it can help Bangladesh move one step closer to safe, precise, globally benchmarked surgical care—delivered at home.

Sincerely
Dr. Arif Mahmud
Group Medical Director
Evercare Hospitals Bangladesh

Pulse
Official Journal of Evercare Hospitals Bangladesh

Thanks to the reviewers,

The quality of a medical journal depends on the authors who submit their articles, but also on the reviewers who analyze, correct,value, and select these articles. Their work is anonymous and yet essential. Below is list of reviewers of Pulse journal. We thank them all for taking time out of their agendas to contribute to the excellence of the journal.

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Availability of BCPS Approved Training Facilities in Evercare Hospitals Bangladesh

The Evercare Hospital Dhaka (EHD) is not only a corporate hospital of a high standard, but also a renowned institution for providing upgraded training facilities for the young aspirant postgraduate doctors, wishing to pursue a career in their desired field. This training facility is available not only to the employees of EHD, but open to all including individuals working in other hospitals or not working currently. Interested candidates may contact EHD for details and the process of application. The following trainings are approved by the Bangladesh College of Physicians and Surgeons (BCPS) for academic purposes. We believe, availing of this opportunity may fulfill the desire of young doctors to get proper training in desired fields. The list follows.

Sl.	Name of the department for which accreditation was requested	Period of accreditation	Validity of the period
1	Anaesthesiology	01 (One) Year	05(Five Years)
2	Cardiology	01 (One) Year	05(Five Years)
3	Dermatology & Venereology	06 (Six) Month	05(Five Years)
4	Endocrinology & Metabolism	06 (Six) Month	05(Five Years)
5	Gastroenterology	06 (Six) Month	05(Five Years)
6	Hematology	01 (One) Year	05(Five Years)
7	Histopathology (Pathology)	01 (One) Year	05(Five Years)
8	Internal Medicine	01 (One) Year	05(Five Years)
9	Neonatology	01 (One) Year	05(Five Years)
10	Nephrology	06 (Six) Month	05(Five Years)
11	Neurology	01 (One) Year	05(Five Years)
12	Neurosurgery	01 (One) Year	05(Five Years)
13	Obs/Gynae	01 (One) Year	05(Five Years)
14	Ophthalmology	06 (Six) Month	05(Five Years)
15	Orthopedic Surgery	01 (One) Year	05(Five Years)
16	Otolaryngology	01 (One) Year	05(Five Years)
17	Paediatrics	01 (One) Year	05(Five Years)
18	Paediatric Cardiology	06 (Six) Month	05(Five Years)
19	Paediatrics Surgery	06 (Six) Month	05(Five Years)
20	Radiology & Imaging	01 (One) Year	05(Five Years)
21	Respiratory Medicine	01 (One) Year	05(Five Years)
22	Surgery	01 (One) Year	05(Five Years)
23	Thoracic Surgery	06 (Six) Month	05(Five Years)
24	Urology	01 (One) Year	05(Five Years)

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