

## RANGPUR COMMUNITY MEDICAL COLLEGE JOURNAL (RCMC JOURNAL)

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### Vol. 6

No. 1

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## **Evaluation of Liver Function**

\*Rahim MA<sup>1</sup>

The liver is an essential organ of the body that performs over 500 vital functions. These include removing waste products and foreign substances from the bloodstream, regulating blood sugar levels, and creating essential nutrients. Here are some of its most important functions:

- Albumin Production: Albumin is a protein that keeps fluids in the bloodstream from leaking into surrounding tissue. It also carries hormones, vitamins, and enzymes through the body.
- **Bile Production**: Bile is a fluid that is critical to the digestion and absorption of fats in the small intestine.
- Filters Blood: All the blood leaving the stomach and intestines passes through the liver, which removes toxins, byproducts, and other harmful substances.
- **Regulates Amino Acids**: The production of proteins depend on amino acids. The liver makes sure amino acid levels in the bloodstream remain healthy.
- **Regulates Blood Clotting**: Blood clotting coagulants are created using vitamin K, which can only be absorbed with the help of bile, a fluid the liver produces.
- **Resists Infections**: As part of the filtering process, the liver also removes bacteria from the bloodstream.
- Stores Vitamins and Minerals: The liver stores significant amounts of vitamins A, D, E, K, and B12, as well as iron and copper.
- **Processes Glucose**: The liver removes excess glucose (sugar) from the bloodstream and stores it as glycogen. As needed, it can convert glycogen back into glucose.

There is a broad spectrum of laboratory tests used to evaluate liver function and liver damage. Colloquially,

1. Professor Dr. Md. Abdur Rahim Professor of Biochemistry Rangpur Community Medical College Mobile: 01712-555502 E-mail: abdurrahim1967@gmail.com

\*For correspondence

these are referred to as liver function tests, although they are not all direct measures of liver function. Liver testing generally includes alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase (ALP), gamma-glutamyl transferase (GGT), serum bilirubin, prothrombin time (PT), and albumin tests. ALT and AST are markers of hepatocellular damage, ALP and GGT are markers of cholestasis, PT and albumin are indicators of synthetic function, and bilirubin is a nonspecific marker of liver function.<sup>1</sup>

These tests are often available in panels or as standalone assays.

#### **Indications for Testing**

Testing may be ordered as part of a routine evaluation or to screen for and monitor liver disease (eg, viral or alcoholic hepatitis). Test selection should be informed by patient history and clinical evaluation. Elevated liver chemistry or function tests should generally be repeated to confirm results before the initiation of exhaustive follow-up testing.<sup>D2D</sup>

#### Laboratory Testing

The table below briefly describes the tests most often included in the evaluation of liver function. Commonly, hepatic function tests are offered in panels that include the recommended first-tier tests for liver disease evaluation. The pattern of abnormal test results should be evaluated to help identify additional testing strategies and determine the underlying cause. Some suggestive patterns are included in the Patterns of Liver Test Results section.

Test	Interpretation		
Hepatocellular Damage			
	Elevated AST may indicate hepatocellu- lar damage		
AST	The magnitude of AST elevation may vary based on the cause of hepatocellular damage		
	AST is somewhat less specific for liver disease than ALT, as cardiac and skeletal muscle injury may cause AST elevation		

Test	Interpretation		
	Elevated ALT may indicate hepatocellu- lar damage		
	ALT is generally considered the most specific laboratory test for hepatocellular damage		
ALT	ALT concentrations correlate with increasing BMI		
	The magnitude of ALT elevation may vary based on the cause of hepatocellular damage		
	Generally, hepatocellular injury results in an AST:ALT ratio >1		
AST: ALT	However, alcoholic liver disease usually presents with a ratio of $\geq 2$		
ratio	This ratio may also be elevated in cases of NAFLD, cirrhosis, or Wilson disease, but the elevation is usually not >2		

#### Cholestasis

ALP	Elevation of ALP is suggestive of cholestasis ALP concentration may also be impacted by age, pregnancy, and sex GGT and/or 5'NT may be useful to identify whether ALP elevation has a hepatic origin
GGT	GGT measurement can be used to confirm the origin of elevated ALP Elevated GGT indicates a hepatic cause of ALP elevation GGT is often used to evaluate alcohol use, but it is nonspecific and may be elevated with diseases such as NAFLD and other hepatobiliary disorders
5'NT	5'NT measurement can be used to confirm the origin of elevated ALP Elevated 5'NT indicates a hepatic cause of ALP elevation, whereas normal 5'NT is very specific for hepatobiliary disease

#### Nonspecific Marker of Liver Disease

	Elevated bilirubin should be fractionated
	to indirect (unconjugated) and direct
	(conjugated)
ıbin	Abnormal concentrations may indicate

# Bilirubin Abnormal concentrations may indicate cholestasis or hepatocellular damage in the presence of other abnormal liver tests

#### **Synthetic Function Tests**

Albumin	Liver disease decreases albumin synthe- sis and decreases serum albumin concen- tration In the absence of other markers of liver
	disease, low albumin concentration may be related to malnutrition or protein loss (eg, malabsorption)
РТ	Elevated PT that is unresponsive to vitamin K supplementation is suggestive of poor liver function

#### Fibrosis

Noninvasive fibrosis staging	The degree of fibrosis can be estimated using a combination of clinical and biochemical variables There are several available scoring systems that use different combinations of clinical factors and laboratory tests to calculate a "fibrosis score" that correlates with the severity of liver damage
5'NT, 5	nucleotidase; BMI, body mass index;

NAFLD, nonalcoholic fatty liver disease

#### Patterns of Liver Test Results:

#### **Hepatocellular Pattern**

Elevated ALT and AST concentrations indicate a hepatocellular liver injury.<sup>3</sup>

The differential diagnosis may include viral or autoimmune hepatitis, hemochromatosis, alpha 1-antitrypsin deficiency, or Wilson disease.

If AST elevation is predominant, consider alcohol-related liver damage or cirrhosis.

Although the pattern of AST and ALT may help guide differential diagnosis, additional testing is required for diagnosis. Other liver tests such as bilirubin may also yield elevated results in patients who exhibit a pattern consistent with hepatocellular injury.<sup>4</sup>

#### **Cholestatic Pattern**

Increased ALP and GGT concentrations are indicative of cholestas is.  $^{\rm 5,6}$ 

To determine if ALP elevation is of hepatic origin, GGT should be evaluated.<sup>6</sup>

Cholestatic patterns may be due to hepatobiliary causes such as primary biliary cholangitis (PBC), primary sclerosing cholangitis (PSC), biliary obstruction, or cholestasis.<sup>1,5,6</sup>

#### **Mixed Pattern**

If the pattern of elevation includes features of hepatocellular damage and cholestatic injury, the result is said to be "mixed."

A mixed pattern of liver test results accompanied by jaundice is often due to drug-induced liver disease. However, this pattern may also be observed in patients with late-stage acute viral hepatitis or early-stage acute biliary obstruction.<sup>7</sup>

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## Clinical Outcome and Etiologies of Traumatic Tympanic Membrane Perforation

\*Hossen MF<sup>1</sup>, Choudhury MA<sup>2</sup>, Islam SS<sup>3</sup>, Islam MS<sup>4</sup>, Lopa LA<sup>5</sup>

#### Abstract:

**Background:** Trauma remains a regular occurrence relating to activities and lifestyle of humans and it can affect any part of the body. The ear is located within the cranio-facial skeleton which is exposed to environmental trauma that can occur as blunt injuries like contusion, concussion, decompression, and penetrating injuries as fractures.

**Objective:** To assess the clinical outcome and etiologies of traumatic tympanic membrane perforation.

*Materials and methods:* This prospective cohort study was conducted at Private Chamber, Sun Diagnostic Centre, Rangpur, Bangladesh from January to December 2021. Total 60 patient included who presented to outpatient department of ENT Dept. at Private Chamber. Patients willing to be included in study and patients of all age group and gender with traumatic TM perforation were included in the study. Those patients with non-traumatic TM perforation as well as the traumatic perforation of TM with severehead injury, unconscious patients or patients with polytrauma were excluded from the study.

**Results:** Sixty patients who presented to the outpatient department of ENT and casualty of private chamber included in the study. Out of which, 16 patients were males (26.7%) and 44 were females (73.7%). Most of the patients fell under 20-30 age group (n=28 [46.7%]). Mean age group was 33.1 years and 73.3% were males. Ear pain was the commonest symptom with accidental trauma being the most common cause. 70% of them had left TM perforation and posteroinferior quadrant was mostly involved.

**Conclusions:** Traumatic TM perforation is commonly seen in young adults follow ingaccidental trauma and as sault. Earache, suddenhearingloss and tinnitusare the common symptoms. Most of the cases heal spontaneously with conservative management.

Keywords: TM, Trauma, Perforation, PTA

#### Introduction:

Trauma remains a regular occurrence relating to activities and lifestyle of humans and it can affect any part of the body. The ear is located within the cranio-facial skeleton which is exposed to

1. Dr. Md. Feroz Hossen

Assistant Professor Department of ENT & Head Neck Surgery Rangpur Community Medical College, Rangpur Mobile: 01723-616412 Email: feroz19794@gmail.com

- 2. Dr. Mahbubul Alam Choudhury Assistant Professor Department of ENT & Head Neck Surgery Nilphamari Medical College, Nilphamari
- Dr. Syed Sanaul Islam Assistant Professor Department of ENT & Head Neck Surgery Shaheed Ziaur Rahman Medical College, Bogura
- 4. Dr. Md. Saiful Islam Research Assistant, BIFUM, Dhaka

5. Dr. Lubzana Afrin Lopa Research Assistant, BIFUM, Dhaka \*For Correspondence like contusion, concussion, decompression, and penetrating injuries as fractures<sup>1</sup>. Major injuries affecting the ears can lead to disturbances in hearing and difficulties in maintenance of balance especially when the inner ear is affected<sup>2</sup>. It canal so result from attempt so fself-cleaning of the ear, scratching theear with sharp objects and due to various iatrogenic causes. Traumatic perforation of the tympanic membrane is a common injury that is under reported, hence there is a need to educate on unskilled removal of foreign body, early identification, evaluation and referral of patients so as toreduce them or bidity. It is sometime associated with injuries of the ossicular chain and inner ear. It is a source of great concern for otorhinolaryngologist to restore completely the functional integrity of tympanic membrane and associated structures<sup>3</sup>. More of ear trauma however affect either the bony skeleton or soft tissue structures within the external and middle ear. Ear injuries may lead to lacerations in the external ear, and disruption of

environmental trauma that can occur as blunt injuries

the ossicular chain in the middle ear cavity. TM could be ruptured by trauma due to hair pin, matchstick or unskilled attempts to remove a foreign body, sudden change in air pressure e.g., a slap on the ear or a sudden blast, pressure by a fluid column, e.g., diving or forceful syringing, fracture of temporal bone etc<sup>4</sup>. The common manifestations of traumatic TM perforation are sudden severe pain, bleeding, hearing impairment, tinnitus and dizziness<sup>5</sup>. This symptom atology depends upon the site and severity of perforation. Treatment of TTM Prange from in active watch fulwaiting, active intervention to surgical

intervention<sup>6</sup>. The tympanic membrane (TM) is a delicate translucent fibrous membrane which separates the external from the middle ear, and it produces a rupture, tear or perforation when traumatized. The TM injury can predispose to middle ear infection which has grave consequences including facial nerve paralysis, formation of cholesteatoma, perilymph fistula, intracranial infections and may require ear and intracranial exploration<sup>7</sup>. Significant morbidity or mortality can occur when traumatic ear injuries are associated with damage to contiguous facial structures and the brain. Effective management is expedient while prevention and reduction of complications must be given utmost attention to achieve a good outcome.

#### Materials and methods:

This prospective cohort study was conducted at Private Chamber, Sun Diagnostic Centre, Rangpur, Bangladesh from January to December 2021. Total 60 patient included who presented to outpatient department of ENT Dept. at Private Chamber. Patients willing to be included in study and patients of all age group and gender with traumatic TM perforation were included in the study. Those patients with non-traumatic TM perforation as well as the traumatic perforation of TM with severe head injury, unconscious patients or patients with polytrauma were excluded from the study. The patients fulfilling the inclusion and exclusion criteria were selected using simpler and omsampling. The procedure protocol of the intended study was explained to the patients and informed written consent was taken from them. Demographic data was recorded. A detailed history was taken to find out the symptomatology, the cause of perforation, the time of presentation etc. Thorough examination of ear, nose and throat and otoscopic examination of ears were performed. The characteristics of the perforation like size and site of perforation was noted. Less than 25% of TM involvement was considered as small size perforation,

25-50% involvement was considered as medium sized perforation and 50-75% was considered as large sized perforation. PTA of the included patients was carried out at the time of presentation, at 3 months and at the end of 4 months. If the patient had painat the time of presentation, the first PT A assessment was delayed for 7 days. Outcome of injury in terms of healing of the perforation and associated complications was also assessed. The patients were followed up for a period of 4 months. The data was an alysed statistically employing frequency and percentage using SPSS software.

#### **Results:**

Sixty (60) patients who presented to the outpatient department of ENT and casualty of private chamber included in the study. Out of which, 16 patients were males (26.7%) and 44 were females (73.3%). Most of the patients fell under 20-30 age group (n=28 [46.7%]).



Fig-1: Gender distribution of patient studied

Table I: Age distribution of patient studied

Age group	n	%
10-20	2	3.3%
20-30	28	46.7%
30-40	14	23.3%
40-50	12	20.0%
50-60	4	6.7%
Total	60	100.0%

Majority of the patients presented with complaints of ear pain (n=34 [56.7%]), followed by decreased hearing (n=24 [40%]). Twenty-four patients presented with tinnitus (26.7%), four patients with aural fullness (6.7%) and Two patient presented with bleeding from ear (3.3%).

Table II: Clinical symptoms of patients studied

	n	%
Ear pain	34	56.7%
Bleeding from ear	2	3.3%
Tinnitus	16	26.7%
Decreased Hearing	24	40%
Aural Fullness	4	6.7%

Most of the patients presented with the complaints within 6 hours (n=30 [50%]). Around 24 patients (40%) presented after 1 day and rest of the patients presented between 6 hours to 1 day.

Table III: Time of presentation of the patients

Time	n	%
<6hrs	30	50.0%
6hrs-1day	6	10.0%
>1day	24	40.0%

Overall, the common causes of perforation were accidental trauma (n=28 [46.7%] followed by assault (n=25[41.7%]). Accidental hit against wall, hit by cow, sudden exposure to loud noise etc. were included among the causes in accidental trauma. Only 2 patient presented with traumatic tympanic perforation due to RTA. One patient had presented with foreign body in ear (tick) which on examination was seen lying on the TM. The attempted removal caused perforation of the TM and this was included as the iatrogenic cause.

#### **Table IV: Cause of perforation**

	n	%
Assault	25	41.7%
Accidental self-inflicted injury	3	5.0%
Accidental trauma	28	46.7%
Iatrogenic	2	3.3%
RTA	2	3.3%

Out of the 60 patients included in the study, 42 patients (70%) had left ear involvement and the rest 18 patients (30%) were affected on the right ear. Majority of the patients (n=50 [83.3%]) had only one perforation in the TM, whereas, 10 patients (16.7%) had two perforations in the TM on the same side. 54 patients (90%) had small sized perforation and only 6 patients (10%) had medium sized perforation. Postero

inferior quadrant was the common estquadrant involved (n=30 [50%]) followed by antero inferiorquadrantin 10 patients (16.7%) and involvement of both anteroinferior and posteroinferior quadrant was seen in 6 patients (10%). PTA performed at the time of presentation revealed minimal hearing loss (15-25 dB) in 30 patients (50%) and normal values in rest of the 30 patients (50%). The repeat PTA performed at 3rd and 4th month of presentation revealed normal values in all the patients. All the patients were managed conservatively and none of them developed complications and the traumatic perforation healed within 3 months in all patients.

#### Table V: Ear involved

	n	%
Right	18	30.0%
Left	42	70.0%

#### Table VI: Size of perforation

	n	%
Small	54	90.0%
Medium	6	10.0%



Figure 2: Quadrant of TM involved

AI-anteroinferior, PI-posteroinferior, AS-anterosuperior, PS- posterosuperior.

Table VII: PTA findings at presentation, after 3months and 4 months

РТА									
	prese	At ntation	After 3 months	After 4 months					
	n	%	n	%					
Minimal	30	50.0%	60	100.0%					
Normal	30	50.0%	60	100.0%					

#### **Discussion:**

Traumatic injuries are often sporadic in occurrence and are mostly unplanned events thus patients who sustain such injuries consult the nearest available doctor for initial evaluation. About three quarter (73.6%) of the patients in this study had been evaluated initially by non-specialist Otolaryngologist. This may also connote scarcity of needed specialists in our locality. Nevertheless, most patients still presented and were reviewed by Otolaryngologists within 72 hours of the injuries. These relatively-early presentations might not be unconnected with the disturbing symptoms which evoked some anxiety in the patients. This finding could be a result of more outdoor activities in males when compared to females. In this study, the commonest age group affected was 20-30 years. Other studies have reported age ranges of 29.2. to 33.6 years<sup>7,8</sup>. In this study, the common presenting symptoms of the patients were ear pain (56.7%), decreased hearing (40%) and tinnitus (26.7%). In a study conducted by Sogebi et al, hearing loss was the commonest symptom with which the patients presented accounting to 64.2%, followed by tinnitus in 50.9 % and earache in 41.5%<sup>5</sup>. 50% of the patients included in this study presented within 6 hours and about 40% of the patients reported after 1 day. Other studies have reported a mean duration of presentation as 3 days. In this study, accidental trauma was the commonest cause of traumatic TM perforation, followed by as sault. Louetaland Sarojammaetal in their studies have reported assault to be the commonest cause of TM perforation<sup>8,9</sup>. This difference that was noticed may be because of the reluctance that the common people show to reveal the truth. Left ear was the common esteartobe involved, and so was the result as observed by many of the earlier studies. Asopined by Sarojammaetalin their study, it may be due to the fact that slap was a major etiological factor and a right-handed person tends to slap the victim over the left ear9. In our study, majority of the patients had single perforation in the TM on examination and about 5 patients had two perforations in the TM and most of it were of small sized perforation. This might be the reasonfornormal PT Aresultsin 50% of the patients, at the time of presentation. Aspertheresults of our study, posteroinferior quadrant (50%) was the commonest to be involved, followed by anteroinferior quadrant (16.7%). As the TM lie obliquely in the medial end of external auditory canal, with the angle of  $55^{\circ}$ , the posterior part is more lateral than its anterior part. As most of the cases of traumatic TM perforation heals spontaneously within two months, otolaryngologists

have however been advised to be reluctant in offering surgical intervention in cases of TTMP without significant symptoms<sup>10</sup>. All the study participants in our study were managed conservatively and their perforations healed within an average duration of 3 months, without development of complications. Active interventions for treating traumatic TM perforation include topical application of substances like epidermal growth factor, enoxaparin, and ascorbic acid to stimulate epithelization for quick closure and to prevent formation of sclerotic plaques in the perforated membrane<sup>11-13</sup>. As per the observations of other studies, factors associated with poor healing were postero- superiorly-located perforations, large sized perforations and penetrating injuries to the TM. If not taken care, the TM injury can predispose to middle ear infection which has grave consequences including facial nerve paralysis, formation of cholesteatoma. perilymph fistula, intracranial infections and may require ear and intracranial exploration<sup>14</sup>. When traumatic ear injuries are associated with damage to contiguous facial structures and the brain, significant morbidity or mortality can occur. Effective management and prevention and reduction of complications must be given utmost attention to achieve a good outcome. We had few patients with sero-sanguinous ear discharge and fewer ones with purulent discharge who had ear swab cultured for micro-organisms, but we could not do proper comparative analysis. A limitation to the study was the fact that many patients defaulted, and some were not followed-up for sundry reasons which drastically reduced the sample size. This study thus concludes that TTMP was common in young adult males, caused often by assaults, presented with ear blockage/hearing loss and tinnitus, perforations were located in antero-inferiorquadrant of the TM most of which healed well.

#### **Conclusion:**

Traumatic TM perforation can affect any age group, commonly seen in young adults following accidental trauma and assault. Traumatic perforation was found to be more common among females in the age group of 21-30 years. Them ostcommon presenting complaint was hearing loss. Most common cause for the perforation was due to slap injury. Male preponderance and left ear involvement are commonly observed. Most of the patients present immediately after injury. Majority of the cases heal spontaneously without developing complications. The commonest quadrant of TM involved is posteroinferior followed by anteroinferior. PTA performed at time of

presentation did not reveal any significant hearing loss. Early identification and evaluation are necessary to reduce the attendant morbidity.

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**Original** Article

# **Bacteriological Profile and Antimicrobial Susceptibility Patterns of Blood Culture Isolates** among Febrile Patients \*Hossain MM<sup>1</sup>, Mondal NM<sup>2</sup>, Hasan MQ<sup>3</sup>, Khan MM<sup>4</sup>

#### **Abstract:**

**Background:** Bacterial bloodstream infections are a major public health problem, which leads to high morbidity and mortality of patients. On time diagnosis and appropriate medication will be the best way to save the lives of affected ones. It is worth noting that the emergence of multi drug resistance to most of the antibiotics tested, highlights for periodic surveillance of etiologic agent, antibiotic susceptibility to prevent further spread of resistant bacterial pathogens.

**Objective:** To find out the bacterial isolates along with their antimicrobial susceptibility pattern.

Materials & methods: This descriptive cross-sectional study was carried out at two private medical college hospitals in Bangladesh from January 2018 to December 2020. During this period, a total of 1883 blood samples with suspected bacteremia and history of febrile illness from adult and children (below 18 years) were included. About 10 ml of venous blood for adults and 3 ml for children was collected aseptically and transferred into a BD BACTECTM bottle and incubated in the automated BD BACTECTM system at 37°C for 72 hours. The preliminary signal of bacterial growth in BD BACTECTM bottle was detected. Then sub-cultures were made on blood agar, chocolate agar and MacConkeys agar media and examined after 18-24 hours of incubation. Bacterial isolates were identified by Colony morphology. Gram staining reaction, relevant biochemical tests. Antimicrobial susceptibility test was carried out by the Kirby-Bauer disc diffusion method using Mueller-Hinton agar (MHA) media according to Clinical Laboratory Standards Institute (CLSI) guidelines 2712 and antibiotic disc from OXOID CO. The antibiotics tested were Amoxicillin, Ampicillin, Amoxicillin-Clavulanic acid, Co-trimoxazole, Cefixime, Cloxacillin, Cephalexin, Ceftriaxone, Nalidixic acid, Ciprofloxacin, Nitrofurantoin, and Gentamicin; for Pseudomonas, antibiotic Piperacillin was used.

**Results:** Out of total 1883 samples, 4.78% showed bacterial growth. We observed higher rate of culture positivity among those who did not receive antibiotics before sample collection (5.93%), compared to them who received antibiotics before blood collection (3.61%). This difference is statistically significant at 95% confidence interval. We found nine different pathogens grown in 1883 blood samples; Escherichia coli was the most common organism isolated (27.78%), followed by Staphylococcus aureus and Salmonella group (21.11%) each). E. coli found 100.00% sensitive to nitrofurantoin and meropenem, Salmonella found 100.00% sensitive to chloramphenicol & ceftriaxone and Klebsiella shown 100.00% sensitivity to meropenem. Staphylococcus aureus is mostly sensitive to vancomycin and linezolid (100.00%) and Pseudomonas found mostly sensitive to piperacillin-tazobactam, amikacin, meropenem, ceftazidime and tobramycin (75.00 to 88.00%). Other organisms shown variable sensitivity pattern in this study.

**Conclusion:** It can be inferred that due to wide variations in bacterial drug resistance, results of studies in one geographical region or in a period of time might not correlates with for other regions or periods of time.

Keywords: Bacterial infections, Diagnosis, Appropriate medication, Multi drug resistance, Antibiotics, Etiologic agent, Antibiotic susceptibility

- 1. Dr. Md. Mahbub Hossain Associate Professor, Department of Medicine Enam Medical College, Savar, Dhaka Email: mahbubhossain1952@gmail.com Mobile: 01723-976987
- 2 Dr. Nelson Taposh Mondal Associate Professor, Department of Medicine Enam Medical College & Hospital, Dhaka
- 3. Dr. Mohammad Quamrul Hasan Associate Professor, Department of Gastroenterology Enam Medical College and Hospital, Saver, Dhaka
- 4. Dr. Mohammed Momenuzzaman Khan Associate Professor, Department of Neurology Enam Medical College & Hospital, Savar, Dhaka

\*For Correspondence

#### Introduction:

Bloodstream infection (BSI) remains one of the important causes of morbidity and mortality throughout the world. This may result in death or serious morbidity including admission to intensive care or prolonged hospital stay<sup>1</sup>.

Patients commonly present to the hospital with fever and that may be attributable to a wide range of clinical diseases or infection<sup>2,3</sup>. The timely and appropriate use of antibiotics is currently the only way to treat bacteraemia. Many bacteria have been reported which cause bacteraemia with variation in distribution from

place to place<sup>4</sup>. A wide range of bacteria has been described in febrile patients including gram negative bacteria such as Salmonella species, Escherichia coli, Pseudomonasaeruginosa, Klebsiella species, Neisseria meningitidis, Haemophilusinfluenzae, and gram positive such as coagulase negative staphylococci (CNS), Staphylococcus aureus, Streptococcus pneumoniae, Streptococcus preproces, Streptococcus agalactiae, and Enterococcus faecium.<sup>2,3,4,5,6,7</sup>

The blood culture represents a critical tool for the detection of bloodstream infections. Despite its limitations, the blood culture remains the "gold standard" for the detection of bacteremia<sup>8</sup>. It also provides essential information for the evaluation of a variety of diseases like endocarditis, pneumonia, and pyrexia of unknown origin and particularly, in patients with suspected sepsis<sup>9</sup>. However, many bacterial pathogens have become resistant to antibiotics and become a serious public health concern with economic and social implications throughout the world. The infections caused by multi drug resistance organisms are more likely to prolong the hospital stay, increase the risk of death and require treatment with more expensive antibiotics.<sup>10</sup>

An accurate interpretation of culture results is critical not only from the perspective of individual patient care but also from the standpoint of hospital epidemiology and publichealth<sup>8</sup>. Researches in various countries revealed that there is high bacterial drug resistance to commonly used antibiotics mainly due to the lack of national guideline for antibiotic use in some developing countries. There is also absence of good laboratory facilities to do antimicrobial drug susceptibility test. As a result, clinicians use empirical way to treat their patients. There is also high self-treatment of humans, and animals without prescription of doctors. These lead to emergence and rapid dissemination of resistance<sup>11</sup>. In Bangladesh, there are only a few studies on organisms involved in bloodstream bacterial infection and their susceptibility pattern thus the present study was aimed to determine the bacterial agents associated with bacteremia along with their AST patterns in febrile patients attended to a tertiary care hospital.

#### Materials & methods:

This descriptive cross-sectional study was carried out at Rangpur Community Medical College Hospital, Rangpur, Bangladesh and Enam Medical College Hospital, Dhaka, Bangladesh from January 2018 to December 2020. During this period, a total of 1883 blood samples with suspected bacteremia and history of febrile illness from adult and from children (below 18 years) were included. Laboratory procedures: About 10 ml of venous blood for adults and 3 ml for children was collected aseptically using 70%alcohol and 2% tincture of iodine and transferred into a BD BACTECTM bottle. Blood culture broths were then incubated in the automated BD BACTECTM system at 37°C for72 hours.

The preliminary signal of bacterial growth in BD BACTECTM bottle was detected. Then sub-cultures were made on blood agar, chocolate agar and Mac-Con keys agar media (OXOID CO. UK) and incubated aerobically at 37° C. The chocolate agar plates were incubated at 37º C in 5-10% CO<sub>2</sub> (Candle jar) and examined after 18-24 hours of incubation. Bacterial isolates were identified by Colonymorphology, Gram staining reaction, biochemical tests using Catalase test, Coagulasetest, Oxidase test, Triple Sugar Iron agar (TSI)(OXOID, UK),Citrate utilization test(BBL<sup>™</sup>), Urease test (BBL TM) and Motility Indole Urea (MIU) (BBLTM) test and use of antisera for Salmonella for the standard procedure for bacterial identification11.Blood culture broths without any signal within 72 hours of incubation were sub-cultured before being reported as a negative result.

Antimicrobial susceptibility test was carried out by the Kirby-Bauer disc diffusion method using Mueller-Hinton agar (MHA) media according to Clinical Laboratory Standards Institute (CLSI) guidelines 2012 and antibiotic disc from OXOIDCO. Minimum distance of the disc was 24 mm from center to center. Zone of inhibition was measured in millimeters after 24 hours of incubation. Based on the zone of inhibition obtained, the isolates were classified into sensitive, and resistant pattern. The antibiotics tested were Amoxicillin, Ampicillin, Amoxicillin-Clavulanic acid, Co-trimoxazole, Cefixime, Cloxacillin, Cephalexin, Ceftriaxone, Nalidixic acid, Ciprofloxacin, Nitrofurantoin, and Gentamicin; for Pseudomonas, antibiotic Piperacillin was used.

Data analysis was performed using the SPSS windows version 16.0 software. Tests of significance like Pearson's chi-square test and Fisher Exact test were applied to find out the results. A value of P<0.05 was considered statistically significant.

#### **Results:**

Out of total 1883 samples, 4.78% showed bacterial growth. We have grouped our patients considering three different variables: by the sex of the patients, by the age of the patients and whether they received

antibiotics before blood culture has sent.

In our study, we had 1037 (55%) male and 846 (45%) female. Among the male patients 5.92% and among the female patients 3.18% shown bacterial growth but *this difference is not statistically significant in 95% confidence interval; p value is* > 0.05.

 
 Table I: Culture positivity according to the sex of the patients

Sor	]	Positive	]	Negative	$\mathbf{v}^2$	Dualua
Sex	N	Percentage	Ν	Percentage	Λ	r value
Male	49	4.73%	988	95.27%	0.015	0 002/28
Female	41	4.85%	805	95.15%	0.015	0.902428

Considering the age groups; in the paediatric age group (age below 18 years) only 3.18% of the patients shown culture positivity but in the adult patients (age 18 years and above) the culture positivity rate is nearly 6%; *this difference is statistically significant in 95% confidence interval: p value is <0.05*.

 
 Table II: Culture positivity according to the age group of the patients

Sor	Positive		Ν	legative	$\mathbf{v}^2$	Develope	
Sex	N	Percentage	N	Percentage	- Л	i value	
Age below	25	3.18%	760	96.89%			
18 years					4.2938	0.038251	
18 years and	65	5.92%	1033	3 94.08%			
above							

Among the patients who received antibiotics before sample collection, 3.61% showed bacterial growth; on

the other hand, among them who did not receive antibiotics before blood collection, 5.93% yield bacterial growth. *This difference is statistically significant in 95% confidence interval.* 

Table	e III: Culture	positivity a	according to	the status	of
prior	antibiotics tr	eatment be	fore sample	collection	

	P	ositive	N	egative	$\mathbf{v}^2$	Dualma
	N	Percentage	N	Percentage		r value
Received prior antibiotics	26	3.61% 7	714	96.39%	4.2938	0.038251
Received no antibiotics	64	5.93% 10	079	94.07%	I	

We found 9 different pathogens grown in 1883 blood samples. Escherichia coli was the most common organism isolated (27.78%), followed by Staphylococcus aureus and Salmonella group (21.11% each); other organisms grown includes Pseudomonas (12.11%), Klebsiella, Actinobacter & Enterobacter (5.56% each). Streptococcus pnuemoniae (4.44%), and Streptococcus pyogens (2.22%). Most frequent pathogens isolated in the paediatrics age group (12 years and below) were Staphylococcus aureus (44.00%) which is followed by Salmonella group (16%), Escherichia coli (12%) and Pseudomonas (12%). In adult age group the most, frequent pathogens were Escherichia coli (33.85%), which is followed by Salmonella group (23.08%) and then Staphylococcus *aureus* (12.31%) and Pseudomonas (12.31%).

Table I v . I achozens luchtnicu il om the blood sample	Table IV:	Pathogens	identified	from the	blood	sample
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Nama of the Besterie		Child	Adult		Adult			
	Ν	Percentage	N	Percentage	Ν	Percentage		
Escherichia coli	3	12.00%	22	33.85%	25	27.78%		
Staphylococcus aureus	11	44.00%	8	12.31%	19	21.11%		
Salmonella	4	16.00%	15	23.08%	19	21.11%		
Pseudomonas	3	12.00%	8	12.31%	11	12.22%		
Klebsiella	1	4.00%	4	6.15%	5	5.56%		
Actinobacter	1	4.00%	4	3.08%	5	5.56%		
Enterobacter	2	0.00%	3	3.08%	5	5.56%		
Streptococcus pneumonae	1	4.00%	3	4.62%	4	4.44%		
Streptococcus pyogens	1	4.00%	1	1.54%	2	2.22%		
Total	25		65		90			

Table V shows that E. coli found 100.00% sensitive to nitrofurantoin and meropenem; chloramphenicol and nalidixic acid both shown 76.00% sensitivity, this organism found over 50.00% resistant to amoxicillin, levofloxacin and gentamycin. Over 50.00% organisms shown sensitive to amoxicillin-clavulanic acid, cefixime, cephalexin, ceftriaxone, co-trimoxazole and ciprofloxacin. Salmonella is mostly sensitive to chloramphenicol & ceftriaxone (100.00%), levofloxacin & cefixime sensitivity is 89.47% and sensitivity meropenem & amoxicillin-clavulanicacid are 78.95% each. Over 60.00% organisms shown sensitive to amoxicillin, cephalexin, and ciprofloxacin. This organism found over 50.00% resistant to amoxicillin, and co-trimoxazole. Klebsiella shown 100.00% sensitivity to meropenem and 80.00% sensitivity to Chloramphenicol but found mostly resistant to other antibiotics.

Table V: Antibiotics sensitivi	ty of Gram's negative bacilli (	(Salmonella, E. coli and Klebsiella)
Table V. Therbiotecs sensitivi	cy of Gram's negative backing	Samonena, E. con and Recostena)

	E n:	Coli =25	Sa	lmollena n=19	Kleb n	osiella =5
Antibiotics	Positive	Negative	Positive	Negative	Positive	Negative
Amoxicillin	11	14	13	6	0	5
	44.00%	56.00%	68.42%	31.58%	0	100.00%
Amoxicillin-Clavulanic acid	15	10	15	4	2	3
	60.00%	40.00%	78.95%	21.05%	40.00%	60.00%
Chloramphenicol	19	6	19	0	4	1
	76.00%	24.00%	100.00%	0.00%	80.00%	20.00%
Cefixime	13	12	17	2	-	-
	52.00%	48.00%	89.47%	10.53%	-	-
Cephalexin	13	12	12	7	2	3
	52.00%	48.00%	63.16%	36.84%	40.00%	60.00%
Ceftriaxone	15	10	19	0	3	2
	60.00%	40.00%	100.00%	0.00%	60.00%	40.00%
Co-trimoxazole	15	10	9	10	1	4
	60.00%	40.00%	47.37%	52.63%	20.00%	80.00%
Ciprofloxacin	13	12	12	7	2	3
	52.00%	48.00%	63.16%	36.84%	40.00%	60.00%
Gentamycin	12	13	-	-	1	4
	48.00%	52.00%	-	-	20.00%	80.00%
Levofloxacin	11	14	17	2	-	-
	44.00%	56.00%	89.47%	10.53%	-	-
Meropenem	25	0	15	4	5	0
	100.00%	0%	78.95%	21.05%	100.00%	0%
Nalidixic acid,	19	6	6	13	2	3
	76.00%	24.00%	31.58%	68.42%	40.00%	60.00%
Nitrofurantoin	25	0	-	-	2	3
	100.00%	0.00%	-	-	40.00%	60.00%

Table VI shows that Staphylococcus aureus is mostly sensitive to vancomycin and linezolid (100.00%), sensitivity to gentamycin and chloramphenicol found

after that (78.95% and 89.47% respectively). This organism is mostly resistant to co-trimoxazole and amoxicillin.

	Staphylococcus aureus n=19		Streptococ	cus pnuemo n=4	niae Streptococcus pyogens n=4		
Antibiotics	Positive	Negative	Positive	Negative	Positive	Negative	
Amoxicillin	7	12	1	1	3	1	
	36.84%	63.16%	50.00%	50.00%	75.00%	25.00%	
Amoxicillin-Clavulanic acid	10	9	2	0	4	0	
	52.63%	47.37%	100.00%	0.00%	100.00%	0.00%	
Chloramphenicol	15	4	2	0	3	1	
	78.95%	21.05%	100.00%	0.00%	75.00%	25.00%	
Cefixime	-	-	2	0	4	0	
	-	-	100.00%	0.00%	100.00%	0.00%	
Cephalexin	-	-	2	0	4	0	
	-	-	100.00%	0.00%	100.00%	0.00%	
Ceftriaxone	10	9	2	0	4	1	
	52.63%	47.37%	100.00%	0.00%	100.00%	25.00%	
Co-trimoxazole	2	17	1	1	-	-	
	10.53%	89.47%	50.00%	50.00%	-	-	
Ciprofloxacin	-	-	-	-	2	2	
	-	-	-	-	50.00%	50.00%	
Cloxacillin	15	4	-	-	-	-	
	78.95%	21.05%	-	-	-	-	
Gentamycin	17	2	-	-	-	-	
	89.47%	10.53%	-	-	-	-	
Vancomycin	19	0	2	0	4	0	
	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%	
Linezolid	19	0	2	0	3		
	100.00%	0.00%	100.00%	0.00%	75.00%	0.00%	
Levofloxacin	-	-	2	0	4	0	
	-	-	100.00%	0.00%	100.00%	0.00%	
Azythromycin	-	-	2	0	4	0	
	-	-	100.00%	0.00%	100.00%	0.00%	

#### Table VI: Antibiotics sensitivity of Gram's positive cocci

**Table VII** shows that Pseudomonas found mostly sensitive to piperacillin-tazobactam, amikacin, meropenem, ceftazidime and tobramycin (75.00 to 88.00%). Actinobacter found 100% sensitive to piperacillin-tazobactam, cefepime and meropenem;

this organism is also found 80.00% sensitive to amikacin & ciprofloxacin and 60:00% sensitive to aztreonam, ceftriaxone and levofloxacin. Enterobacter found 100% sensitive to ampicillin, ciprofloxacin, gentamycin, levofloxacin, vancomycin and linezolid.

	Pseud n	omonas =8	Actinobacter Enterobac n=5 n=5		nterobacter n=5	
Antibiotics	Positive	Negative	Positive	Negative	Positive	Negative
Ampicilin	-	-	-	-	5	0
	-	-	-	-	100.00%	0.00%
Piperacillin-tazobactam	7	1	5	0	-	-
-	87.50%	12.50%	100.00%	0.00%	-	-
Aztreonam	-	-	3	2	-	-
	-	-	60.00%	40.00%	-	-
Cefepime	-	-	5	0	-	-
	-	-	100.00%	0.00%	-	-
Penicillin	-	-	-	-	0	5
	-	-	-	-	0.00%	100.00%
Ceftriaxone	4	4	3	2	-	-
	50.00%	50.00%	60.00%	40.00%	-	-
Amikacin	6	2	4	1	-	-
	75.00%	25.00%	80.00%	20.00%	-	-
Ciprofloxacin	5	3	4	1	0	5
	62.50%	37.50%	80.00%	20.00%	0.00%	100.00%
Meropenem	6	2	5	0	-	-
-	75.00%	25.00%	100.00%	0.00%	-	-
Gentamycin	5	3	-	-	5	0
-	62.50%	37.50%	-	-	100.00%	0.00%
Ceftazidime	6	2	2	3	-	-
	75.00%	25.00%	40.00%	60.00%	-	-
Levofloxacin	-	-	3	2	5	0
	-	-	60.00%	40.00%	100.00%	0.00%
Tobramycin	7	1	-	-	-	-
-	87.50%	12.50%	-	-	-	-
Vancomycin	-	-	-	-	5	0
•	-	-	-	-	100.00%	0
Linezolid	-	-	-	-	5	0
	-	-	-	-	100.00%	0

Table VII: Antibiotics sensitivity of Pseudomonas, Actinobacter and Enterobacter

#### **Discussion:**

In this study, out of total 1883 samples tested only 4.78% showed bacterial growth; which is quite low as compared to a study conducted by Iqbal et al<sup>12</sup>, who reported a positive culture rate of 12.77%. In few other studies, higher rate of isolation of bacteria were reported as, (14.38%) found in a private diagnostic center in Dhaka<sup>13</sup>, 11.6% found in another study in Bangladesh <sup>(14)</sup>. Isolation rate of 20% was reported from a study done in Nepal<sup>15</sup> and 9.94% in study in India<sup>4</sup>. These differences could be explained in the light of inter country variation. Furthermore, in the

developing countries like Bangladesh, physicians prescribe antimicrobial more than the actual need, all kinds of antibiotics are easily available over the counter and anybody can buy drugs without physician's prescription are responsible for developing pool of resistant bacteria as well as negative results of blood culture<sup>16</sup>.

We found low culture positivity in the paediatrics group (3.18%) than in the adult group (6%); this difference is statistically significant. This result is just opposite what was found in another study where infants recorded the highest true blood culture

positivity (20.9 %), followed by the elderly (13.3 %), children (8.9 %) and adults (7.2 %)<sup>17</sup>.

In our study, Escherichia coli was the most common organism isolated (27.78%), followed by Staphylococcus aureus (21.11% and Salmonella group (21.11%). In a study in Shaheed Suhrawardy Medical College Hospital, Dhaka; Salmonella spp was the single most common pathogen (72.7%) among the recovered isolates<sup>13</sup> and in another Study in BSMMU, Dhaka demonstrates that Salmonella typhi and Salmonella paratyphi isolation rate as 77.97 % and 22.02% respectively<sup>18.</sup>

In our study, Salmonella is 100% sensitive to Ceftriaxone & Chloramphenicol and nearly 90.00% sensitive to Cefixime; in other studies, done in Bangladesh Salmonelle Spphasshown 100% sensitivity to Ceftriaxone and Cefixime<sup>12</sup>. Salmonella shows significant sensitivity to fluroquinolones, Ciprofloxacin (Table V); they do not work as good in vivo because most of them are nalidixic acid resistant due to mutation in QRDR region of gyrA gene<sup>19</sup>.

We found over 100% susceptibility of Salmonella to 78.95% Chloramphenicol, susceptivity to Co-amoxiclav and nearly 50.00% susceptivity to Cotrimoxazole. Decrease resistance to these antibiotics for Salmonella was similar to studies from India<sup>20</sup> and Nepal<sup>21</sup>. As in many developing countries like Bangladesh conventional first-line drugs are very rarely used for almost two decades due to development of resistant strains. This may be due to reduction in the antimicrobial pressure on these organisms' cause lost their resistance genes. Studies have shown that ifantimicrobial is withheld for a long period the organisms lose their resistance gene. Thus, these findings may be helpful to qualify current empirical therapy policies for enteric fever. These findings were in agreement with a study done in Dhaka Medical College, 2017<sup>22</sup>.

More than 90% E. coli and 100% Klebsiella spp. were sensitive to Imipenem and Meropenem. The results for Klebsiella spp. wereconsistent with the study done by Saghir et al. in  $2009^{23}$  who reported 96% sensitivity. The results of E. coli and Klebsiella spp. were also consistent with the study done by Jyothi et al. in  $2013^{24}$  who reported sensitivity of 93% for E. coli and Klebsiella spp.

In the present study, ceftriaxone showed 60.00% sensitivity to both E. coli and Klebsiellaspp. The findings for E. coli and Klebsiellaspp. was not consistent with the studies done by Fayyaz et al.  $(2013)^{25}$  who reported 28% and 22.44% sensitivity respectively. The observation of ceftriaxone resistance pattern is suggestive of the fact that over 40% of E.

coli and Klebsiella spp. isolates were extended spectrumbeta-lactamase (ESBL) producers.

In the present study 21.11% Staphylococcus aureus was isolated. A study done in Bangladesh isolates low (00.28%) rate of staphylococcus<sup>16</sup> but another study done in India the isolation rate was high  $(52\%)^{26}$ .

In our study, Staph aureus (100%) were sensitive to Vancomycin and Linezolid. This correlates well with the sensitivity done in  $India^{26}$ .

Isolation of Pseudomonas was 12.22% and it was found that they were mostly sensitive to piperacillin-tazobactam, amikacin, meropenem, ceftazidime and tobramycin (75.00 to 88.00%). Isolation of Enterococcus spp in this study was 5.56% and all Enterococcus spp showed 100% sensitivity to Vancomycin & Linezolid and 100% resistant to Ciprofloxacin and Penicillin. This result is consistent with the sensitivity done by Nikita et al (2016)<sup>26</sup>.

#### **Conclusion:**

Due to wide variations in bacterial drug resistance, results of studies and reports in one region or in a period of time are not necessarilytrue for other regions or periods of time. It could be assumed these variations might be associated with a series of social, environmental and technological changes.

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**Original** Article

## Prevalence of Thyroid Disorder During Pregnancy in Bangladesh - A Tertiary Care Medical College Hospital Based Study

\*Sadi MA<sup>1</sup>, Khan AH<sup>2</sup>, Rahman F<sup>3</sup>, Islam SMN<sup>4</sup>, Jha D<sup>5</sup>

#### Abstract:

**Background:** Thyroid disorders are one of the most common endocrine disturbances affecting woman of reproductive age. Bangladesh, a densely populated country in South Asia, faces a myriad of public health challenges. The prevalence of thyroid disorders in Bangladesh has been under-researched, particularly in the context of pregnancy.

**Objectives:** To establish the incidence and prevalence of thyroid dysfunction during pregnancy in a tertiary care teaching hospital in Bangladesh.

*Materials & methods:* 537 cases were randomly selected among the pregnant women who reported to antenatal clinic. Later 109 women were excluded as they were already diagnosed cases of thyroid disorder. The rest were investigated for thyroid stimulating hormone (TSH) and if required then they were also investigated for free triiodothyronine (FT3), free thyroxine (FT4), and thyroid peroxidase antibody (TPOAb). Thyroid status was classified according to TSH level–euthyroidism, subclinical hypothyroidism, overt hypothyroidism and hyperthyroidism (sub-clinical hyperthyroidism, Graves' disease/toxic multinodular goiter, transient hyperthyroidism of pregnancy). And all patients were divided into 2 groups – normal/euthyroidism and abnormal/thyroid disorder, considering their thyroid status.

**Results:** The incidence of thyroid disorder during pregnancy was 24.30% and prevalence was 39.66%. The mean TSH levels ( $\mu$ IU/mL) of 1st, 2nd and 3rd trimester were 2.48±1.91,2.04±0.24 and 2.77±2.79, respectively. There were significant difference of incidence of euthyroid (P-0.015) and SCHTh (P-0.002) cases at different stages of gestation. There were also significant number of cases with goiter (P-0.014) and TPOAb (P-<0.001) in different patient groups.

Conclusions: This study has highlighted the importance of recognizing and addressing thyroid disorders during pregnancy in Bangladesh. Our findings demonstrate a significant prevalence of thyroid dysfunction, including hypothyroidism and hyperthyroidism, in pregnant woman in a particular region of the country. Hence, thyroid function test must be advised to all pregnant women.

Keywords: overt hypothyroidism, subclinical hypothyroidism, euthyroidism, hyperthyroidism and Pregnancy

#### Introduction:

Thyroid hormone plays a vital part in pregnancy as a physiological condition since it is essential for fetal growth and maturation. In women of reproductive age,

1.	Dr. Md. Al-Sadi
	Assistant Professor, Department of Endocrinology
	Monno Medical College & Hospital
	Mobile:01781955699
	Email: dr.sadi2012@gamil.com
2.	Dr. Ahsan Habib Khan
	Assistant Professor, Department of Hepatology
	Brahmanbaria Medical College & Hospital
3.	Dr. Fahmida Rahman
	HMO, Deprtment of Radiology & Imaging
	BIRDEM General Hospital
4.	Dr. S M Nazmul Islâm
	Nuclear Medicine Specialist, Popular Diagnostic Cente

- Nuclear Medicine Specialist, Popular Diagnostic Center **Dr. Devesh Jha**
- Reachers Assistant, ARTC \**For Correspondence*

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thyroid disorders are quite prevalent and pregnancy is frequently linked to thyroid dysfunction. The thyroid gland plays an essential role in regulating metabolism and any disruption in its function can have significant consequences for both the mother and the developing fetus including spontaneous abortion, pre-eclampsia, gestational hypertention, gestational diabetes, preterm delivery. The second most prevalent endocrine condition affecting women throughout the reproductive years is thyroid disorders (TD). Pregnancy is a critical period in the thyroid function of women, with changes in thyroid hormone levels and thyroid function that can have significant implications for both the mother and the developing fetus.<sup>1,2,3</sup> Overt hypothyroid and Subclinical hypothyroid was found significantly high in female during pregnancy in south Asia region.<sup>4,5,6</sup> It is not rare that thyroid insufficiency goes undiagnosed during pregnancy because of the nonspecific symptoms. A poorly treated hypothyroid mother can give birth to a child with low intelligence since the fetus depends on the mother's thyroid hormone supply until the end of the first trimester. Autoimmune thyroid illness increases the risk of miscarriage.7 Maternal Graves' disease (GD) can contribute to pregnancy loss as well as fetal thyroid abnormalities. Hyperthyroidism occurs in 0.2% - 0.4% of pregnant women and is most usually related with GD<sup>8</sup>. Geographically, the prevalence of hypothyroidism during pregnancy ranges from 2.5% to 11%. When compared to the West, Asia has a higher prevalence of hypothyroidism. Overt hypothyroidism and sub-clinical hypothyroidism are found in 0.2% and 2.3% of cases during pregnancy, respectively. 9 Thyroid disorders represent a significant public health concern worldwide, with an increased prevalence during pregnancy due to the complex interplay of hormonal, immunological, and metabolic changes that occur in expectant mothers. In developing countries like Bangladesh, where access to healthcare services and diagnostic facilities is often limited, the true prevalence of thyroid disorders in pregnancy remains understudied. This knowledge gap may contribute to suboptimal care for affected pregnant women, potentially resulting in adverse maternal and fetal outcomes.

The present study aims to investigate the prevalence of thyroid disorders in pregnancy at a tertiary care medical college hospital in Bangladesh, providing valuable data to bridge this knowledge gap and inform healthcare policy and clinical practice in the country. By analyzing the prevalence and clinical characteristics of pregnant women with thyroid dysfunction, we aim to generate a comprehensive picture of the burden of thyroid disorders in pregnancy in Bangladesh, and ultimately contribute to the improvement of maternal and fetal health outcomes in this population.

#### Material and methods:

This cross sectional study was conducted from 1<sup>st</sup> November, 2020 to 31<sup>st</sup> October, 2021 at Monno Medical College, a tertiary care hospital. Amongst all pregnant women who reported to antenatal clinic, 537 women were randomly selected after obtaining written informed consent irrespective of their gestational age and gravida status. Later on 109 woman were excluded as per exclusion criteria. Total 428 woman aging from18-35 years from different area of Manikganj District were included by numbering. After selections of subjects, the objectives were explained in details and there informed written consent was taken in easily understandable Bengali phrases. A standard questionnaire was filled up after taking history and through clinical examinations. They were subjected to clinical evaluation with emphasis on the family history of thyroid disorder and presence of thyroid gland enlargement. The participants had their thyroid stimulating hormone (TSH) levels checked, and in the event that there was a problem with the diagnosis or an aberration, measurements of free triiodothyronine (FT3), free thyroxine (FT4), and thyroid peroxidase antibody (TPOAb) were also made. We still advised FT3 and FT4 as TT3, TT4 levels are reliable during the last stage of pregnancy (TT4 reaches the steady level after 16 weeks of pregnancy), despite the fact that total triiodothyronine (TT3) and total thyroxine (TT4) measurement is more reliable during pregnancy and FT3, FT4 pregnancy between different methods.<sup>10</sup> When there was a diagnostic conundrum regarding the kind of hyperthyroidism, which we primarily encountered in the early stages of pregnancy, we exclusively recommended FT3 and FT4 for our patients, regardless of their stage of pregnancy. Thyroid status was classified according to TSH value - euthyroidism, subclinical hypothyroidism (SCH), overt hypothyroidism (O.HypoTh) and hyperthyroidism - sub-clinical hyperthyroidism (SCHTh), Grave's disease (GD)/ toxic multinodular goiter (TMG), transient hyperthyroidism of pregnancy (THP). Normal/euthyroid and abnormal/thyroid disease patients (SCH, O.HypoTh, GD/TMG, SCHTh, and THP) were separated into 2 groups. The American Thyroid Association (ATA) and hospital laboratory reference value defined euthyroid pregnancy as a TSH range of 0.35 to 3.99 IU/mL. Normal maternal TSH levels along with FT4 levels in the lower 2.5th to 5th percentile of the reference range are considered signs of isolated hypothyroxinemia.<sup>10</sup> Patients with isolated hypothyroxinemia were categorized as euthyroid when taking into account a normal TSH value. TSH in the SCH condition ranged from 4.0 to 9.9 IU/mL, and O.HypoTh was taken into consideration when TSH was less than 10 IU/mL.10 TSH 0.35 IU/mL, increased FT4, FT3, and TSH receptor antibody (TRAb) are all signs of GD. When women of childbearing age experience hyperthyroidism, this is the most typical cause. However, if TRAb is negative but the hCG level is excessive (beyond the laboratory reference range), THP is the diagnosis. Typically, THP resolves spontaneously between weeks 14 and 18 of pregnancy.<sup>10</sup> If TSH is less than 0.35 IU/mL, TRAb is negative, and hCG levels are low or normal, it is necessary to consider other possible reasons of hyperthyroidism. Example: If TSH is 0.35 IU/mL but

FT4, FT3, and other tests are normal, SCHTh is diagnosed. However during pregnancy, it is clinically unimportant.<sup>10</sup> TSH, FT4, FT3, TPOAb, were analyzed by using emiluminescent sequential immunometric assay with IMMULITE 1000 immunoassay analyzer. Statistical analysis was done using SPSS 25 software. The categorical variables were represented as percentages and measurable variables as mean $\pm$ SD. One way – ANOVA test were performed for comparing the variables between different groups as appropriate. P value <0.05 was considered to be significant.

#### **Results:**

The current cross sectional study was conducted at Monno Medical College & Hospital from 1st November, 2020 to 31st October, 2021 to find out the incidence and prevalence of thyroid dysfunction during pregnancy in a tertiary care teaching hospital in Bangladesh. 537 women were randomly selected after obtaining written informed consent irrespective of their gestational age and gravida status. After selection process 109 woman were excluded as per exclusion criteria. Total 428 woman aging from 18-35 years from different area of Manikganj District were included by numbering. The mean age of all groups was 24.91± 4.43 years. The prevalence of Thyroid disorder during pregnancy was 39.66%(n=537) and incidence of TD was (24.30%, n= 428). Among TD, the incidence of SCH (15.65%) was the highest. There were significant difference of incidence of euthyroid (P – 0.015) and SCHTh (P - 0.002) cases at different stages of gestation. Presence of family history of thyroid disorder (P - 0.189) in euthyroidism and Thyroid disorder group wasn't significantly different. There was significant difference of goiter (P – 0.014) and TPOAb (P – 0.021) positive cases in both groups.. Details Observation result is provided below.



Figure 1: Prevalence of thyroid disorder during Pregnancy

Figure 1 shows that Prevalence of thyroid disorder during Pregnancy 39.66% (n=537). Out of this 537 respondents Euthyroid was 324(60.34%), O.HypoTH was 81(15.09%), SCH-102(18.99%), GD/MNG-2 (0.37%), SCHTh-23(4.28%), THP-5(0.93%). Among them SCH was highest.

Variables	1st trimester	2nd trimester	3rd trimester	Total	p value
TSH ( $\mu$ IU/mL) Mean ± SD	2.49±1.91	2.04±0.24	2.77±2.79	2.31±1.62	0.824
Euthyroidism N (%)	73 (17.05)	185 (43.22)	66 (15.42)	324 (75.70)	0.015
SCH N (%)	19 (4.44)	34 (7.94)	14 (3.27)	67 (15.65)	0.664
O.HypoTh N (%)	2 (0.47)	3 (0.70)	2 (0.46)	7 (1.64)	0.805
GD/TMG N (%)	0	2 (0.47)	0	2 (0.47)	0.426
SCHTh N (%)	13 (3.03)	6 (1.40)	4 (0.93)	23 (5.37)	0.002
THP N(%)	3 (0.70)	2 (0.46)	0	5 (1.17)	0.178

 Table I: Thyroid hormone status in different trimester

Table I shows Total 428 pregnant woman were studied. Mean TSH ( $\mu$ IU/mL) of 1st, 2nd and 3rd trimesters were 2.49±1.91, 2.04±0.24, 2.31±1.62 respectively. Out of them Euthyroid, SCH,O. Hyothyroidism, GD/TMG, SCHTh, THP was 324(75.7%), 67(15.65%,7(1.64%), 2(0.47&), 23(5.37%), 5(1.17%) respectively. There were significant difference of incidence of euthyroid (P – 0.015) and SCHTh (P - 0.002) cases at different stages of gestation.

 Table II: Comparison between Euthyroidism and thyroid disorder

Variables	Euthyroidism	Thyroid disorder	Total	P value
Family history of TD N%	27 (6.30)	11(2.57)	38(8.87)	0.189
TPO Ab N%	19(4.43%)	21(4.90)	40(9.34)	0.014
Goiter N%	9 (2.10%)	19(4.44)	28(6.54%)	0.021

Total 428 pregnant ladies were studied. Out of them Family history of Thyroid Disorder was positive for 38(8.87%), TPO Ab was positive for 40(9.34%), Goiter was present 28(6.54%). There was significant difference of goiter (P – 0.014) and TPOAb (P – 0.021) positive cases in both groups.

Table III: Distribution of Thyroid disorder according to age group

Age Group	Euthyroidism	O. Hypothyroidism	GD/TMG	SCH	THP	SCHTh	Total
18-25 N (%)	241(56.30)	2(0.47)	0	37(8.64)	2(0.47)	2(0.47)	284(66.35)
26-30 N (%)	60(14.01)	2(0.46)	2(0.46)	20(4.67)	1(0.23)	14(3.27)	99(23.13)
31-35 N (%)	23(5.37)	3(0.70)	0	10(2.34)	2(4.46)	7(1.63)	45(10.51)

Table III shows that out of 428 respondent different age group shows 18-25 yrs had highest Number of prticipant 284(66.35%), SCH 37(8.64%),26-30 yrs age group had 99(23.13%), SCHTh 14(3.27%),31-35 yrs age group had 45(10.51%) participant.

#### **Discussion:**

In this study, the prevalence of thyroid disorder during pregnancy was 39.66%, which was higher than Akram FH et al.<sup>11</sup> The geographical position of Bangladesh might have an important role behind this.<sup>12,13</sup>

The incidence of thyroid disorder during pregnancy was 24.30% - O.HypoTh (1.64%), SCH (15.65%) and Hyperthyroidism (7.01%). The incidence of euthyroidism was 75.70%. In this study, we have found significant number of euthyroid (P-0.015) and hyperthyroid (P-0.002) cases during different trimesters of gestation but difference of the numbers of SCH (P-0.664) and O.HypoTh (0.805) cases wasn't of that significance. Mean TSH (µIU/mL) of 1st, 2nd and 3rd trimesters were 2.49±1.91, 2.04±0.24,  $2.31\pm1.62$ , respectively, though the differences among the trimesters weren't significant (P- 0.824). Patients of O.HypoTh and SCH were treated with levothyroxine. Euthyroid (TSH 2.6-3.99 µIU/mL) patients but TPOAb positive were also considered for levothyroxine treatment if they had history of unexplained pregnancy loss and that was done after assessing the risk-benefit outcome.10

Euthyroid patients with TSH  $0.35 - 2.5 \mu IU/mL$  irrespective of TPOAb status, patients with isolated hypothyroxinemia, THP and SCHy.Th weren't considered for treatment but were advised to check

serum TSH level on regular interval.<sup>10</sup> Patients with hyperthyroidism (GD and TMG) were treated with anti-thyroid drugs (carbimazole and propylthiouracil).<sup>10</sup>



Figure-2: Thyroid status during pregnancy

Figure 2 showed that out of 428 respondents, Euthyroid was 320(74.77%), Overt Hypothy.-7(1.64%), Sub Clinical Hypothyroidism- 67(15.65%), Graves' disease and Toxic Multinodular goiter-2(0.47%), Transient hyperthyroidism of pregnancy-5(1.17%), Subclinical Hyperthyroidism -23(5.37%), Euthyroid considered but for treatment-4(0.93%)

According to Potlukova E et al., age of pregnant women isn't related to prevalence of autoimmune thyroid disorders.<sup>14</sup> This study had the similar result as the mean age of patients of different thyroid status groups; it was mostly indifferent, 25 years. Residence has great importance regarding the prevalence and incidence of thyroid disorders.<sup>15,16</sup>

One of the limitations of this study was that we only

focused on TSH value, though it is recommended to check full thyroid hormone profile before initiating treatment, especially for hyperthyroidism.<sup>10</sup> But because of the lack of trimester specific normal values for FT4, FT3 we decided to do so. Some of the cases failed to provide their thyroid antibody reports and information regarding family history. We only considered TPOAb because anti thyroglobulin antibody detection was not recommended by ATA during pregnancy and also because of limited availability of TRAb testing facility in our country.<sup>10</sup> In this study, we didn't follow up the patients throughout the gestational period. It would have been more appropriate if we had included the data regarding the change of thyroid status and outcome, since we conducted a prevalence and incidence study.

#### **Conclusion:**

Thyroid disorders are a common health concern in pregnant women. The incidence and prevalence of thyroid disorders in pregnancy vary depending on the population and the diagnostic criteria used. However, it is clear that thyroid dysfunction during pregnancy can have serious consequences for both the mother and the developing fetus. Therefore, early detection and appropriate management of thyroid disorders in pregnancy are essential to ensure optimal maternal and fetal outcomes. Close collaboration between obstetricians and endocrinologist is necessary to ensure best possible care for pregnant woman with thyroid disorders.

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**Original** Article

## Reduced Calcium Level in Febrile Seizure: A Case-Control Study

\*Ferdous S<sup>1</sup>, Ahmmed MF<sup>2</sup>, Ferdaus F<sup>3</sup>

#### Abstract:

**Background:** Febrile seizure (FS) is a common cause of convulsion in children. Pathogenesis of febrile seizure is unknown.

**Objective:** The objective of the study was to find the association between serum electrolytes, serum calcium and febrile seizures.

*Materials & method:* This case-control study was conducted on 30 children (6 months to 5 years old) with febrile seizure as the cases and 30 age-matched febrile children as the control group. Serum electrolytes and calcium levels were measured. Statistical analysis was performed with SPSS (version 15) using Student t-test. *Results:* There were no significant differences between the cases and controls in terms of gender or age.

Reduced serum Calcium levels were found in children with febrile seizures and this was statistically significant. **Conclusions:** The findings suggest that, reduced serum calcium levels were significantly associated with febrile seizures in children.

Keywords: Febrile seizure, Electrolytes, Serum calcium

#### Introduction:

Febrile seizure (FS) is a common cause of convulsion in children<sup>1</sup>. About, 2%-5% of children suffer at least one seizure episode during a febrile illness before 5 years old,<sup>2</sup> accounting for 30% of all seizures among children. The underlying pathophysiology of FS is multifactorial and the pathogenesis of FS is unknown in most cases<sup>3</sup>.

Studies have shown different results between reduced serum electrolytes and Seizures. Excitatory post synaptic transmissions that occur with very low calcium state lead to uncontrolled epileptiform discharges. In the brain, hundreds of intracellular processes are known to depend on calcium influx<sup>4</sup>.

Therefore this study was conducted to evaluate the association between serum electrolytes, serum calcium and febrile seizures.

1.	Dr. Shahana Ferdous
	Assistant Professor, Department of Pediatric Gastroenterology
	Khulna City Medical College & Hospital
	Khulna. dr.shahana.ferdous@gmail.com
2.	Dr. Md. Faysal Ahmmed
	Assistant Professor of Rheumatology
	Khulna City Medical College & Hospital
3.	Dr. Farhana Ferdaus
	Associate Professor, Department of Community Medici

Khulna City Medical College, Khulna \*For Correspondence

#### Materials & methods:

A detailed history (Demographic data, seizure details, nature of febrile illness, family history of epilepsy/ febrile seizures), general examination and systemic examination was carried on and followed by laboratory investigations (Serum electrolyte, serum calcium) for the children admitted with seizures between six months to five years and control group is selected from age and sex matched children admitted with Febrile Illness.

Statistical analysis was performed using SPSS version 15 (Chicago, IL, USA) using Student t-test. Data were expressed as the mean  $\pm$  standard deviation (SD). The significant level was set for P<0.05.

#### **Results:**

Mean age of presentation of cases and controls were  $22.83\pm4.25$  and  $23.9\pm7.62$  months respectively. Male to female ratio was almost similar in both the groups. 8 out of 30 (26.6%) cases had family history of FS. Mean (SD) values for serum Calcium and Sodium were  $8.55\pm1.22$  and 138.18 (5.23) for cases;  $9.09 \pm 0.55$ , for controls respectively. Reduced Serum Calcium in cases as compared to controls was ine statistically significant (p 0.0004).

 Table I: Comparison between Cases and Controls regarding Age

Age (months)	Cases (n=30)	Controls (n=30)
10-17	2	7
18-25	21	10
26-33	7	10
34-41	0	3
	Mean age 22.83	Mean age 23.9
	SD±4.25	SD±7.62

 Table II: Comparison between Cases and Controls

 regarding Gender and Family history

Parameters	Cases (n=30)	Controls (n=30)
Male/Female	16/14	14/16
Sex ratio	1:1.14	1:0.87
Family history of FS	8(26.6%)	-

Table III: Showing mean (SD) values of serum calcium (mg/dl)

Serum Calcium	n Cases (n=30)	Controls (n=30)
6.8-7.6	12	0
7.7-8.5	2	4
8.6-9.4	5	19
9.5-10.3	11	7
	Mean 8.55 and	Mean 9.09 and
	SD±1.22	SD±0.55

The p-value is .0004.

The result is significant at p < .05.

Table IV: Showing mean (SD) values of serum sodium (mmol/L)

Serum Calcium	Cases (n=30)	Controls (n=30)
132-135	10	7
136-139	15	16
140-143	4	6
144-147	1	1

The p-value is .81.The result is not significant at p<.05

#### **Discussion:**

FS is the most common cause of convulsion among children. The exact pathophysiology is unknown but predisposing factors like genetic predisposition and alterations may be present. In the present study, we investigated the serum electrolyte and serum calcium levels among children with FS<sup>5</sup>.

In this study, Serum Calcium level in children with febrile convulsions was significantly lower than the control group (P=0.0004). Which is similar to studies by Chiarelli F et al. where Serum levels of sodium and calcium were significantly lower in children with FS and Akbayram S et al<sup>6.7</sup>. But in some other studies there was no association between low Serum calcium and FS in studies by N. Rutter et al, Sakha k et al and Sayedzadeh S A et al<sup>8-9</sup>.

Neuroexcitability increases with reduced serum Calcium levels. Low ionized Calcium levels in the extra cellular fluid, by binding to the exterior surface of the Sodium channel protein molecule in the plasma membrane of nerve cells, increasing the permeability of neuronal membranes to sodium ions, causing a progressive depolarization thus increases the possibility of action potentials. When Calcium ions are absent, the voltage level required to open voltage gated Sodium channels is significantly altered (less excitation is required). With hypocalcemia, action potentials may be spontaneously generated causing contraction of peripheral skeletal muscles resulting in clinical seizures.<sup>10,11</sup>

During fever there is release of stored Calcium from bone reserve occurs<sup>12</sup>. How fever and reduced calcium act in conjunction or in synergy needs to be studied. So, further studies are needed to correlate fever and hypocalemia; which could explain their probable mechanism in producing clinical seizures.

Limitations of the study included a small sample size, hence further multi-centric trials involving larger sample size is warranted.

#### **Conclusion:**

Serum calcium levels were significantly lower in children with febrile seizure in comparison with febrile children without seizure. It can emphasize the hypothesis that there is a relation between hypocalcemia and febrile seizure in children. In future, studies with large sample size are needed to confirm the definitive role of serum calcium in febrile convulsions especially in developing countries like Bangladesh. This study also notify the need to provide calcium rich food or supplements to children.

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## A Study on Functional Endoscopic Sinus Surgery (FESS) of the Patients Attending in Sylhet Women's Medical College: A Comparative Study

\*Rahman MA<sup>1</sup>, Begum MT<sup>2</sup>, Baishnab SK<sup>3</sup>

#### Abstract:

**Background:** By enlarging the sinus ostia, improving mucociliary transport, and creating a better channel for topical medicines, functional endoscopic sinus surgery (FESS) seeks to treat sinusitis. Otolaryngologists continue to disagree over whether sinus surgery is effective in treating nasal polyps. In order to assess the effectiveness of Functional Endoscopic Sinus Surgery (FESS) vs intra nasal polypectomy in the treatment of nasalpolyps, research was conducted.

**Objective:** The aim of the study is to compare the efficacy between functional Endoscopic Sinus Surgery (FESS) with other conventional nasal polypectomy in the patients attending Sylhet Women's Medical College.

*Materials & methods:* Patients with nasal polyposis were separated into two groups for this comparative investigation. FESS received Group A, whereas patients receiving traditional endoscopic endonasal polypectomy received Group B. All patients had surgery and were monitored for effectiveness for six months. For the qualitative variables of effectiveness and gender, frequencies and percentages were determined. Using SPSS software version 23, the chi square test was used to examine the significant difference between the effectiveness of the two groups. A p-value of 0.05 was deemed statistically significant. To manage the impact modifiers, stratification was done for the patients' age, gender, and length of illness.

**Results:** In group A, the prevalence of recurrence was 30.43% whereas in group B, it was 73.90%. In group A, the efficacy rate was 69.56%, while in group B, it was 26.09%. Significant relationship between study group and efficacy was found, with a p-value of 0.006. In group A, 9 patients had efficacy among the age group of 25-45 and 3 patients had recurrence below the age of 25 and in group B, the maximum no of patients of 8 had recurrence above 45 years of age. No significant association was found. There were 78% male patients and 22% patients were female in group A and 70% male patients and 30% patients were female in group B. No significant association was found.

*Conclusion:* FESS is much more effective than traditional intranasal polypectomy in the treatment of sinonasal polyposis. *Age more than 30 years, female gender, and disease duration less than 1 year have a major impact on efficacy.* 

Key words: Functional endoscopic sinus surgery (FESS), Conventional nasal polypectomy

#### Introduction:

Endoscopic sinus surgery (ESS) has come a long way since it was first used. In 1902, endoscopic examination of the sinuses was first introduced. However, during the most of the twentieth century and

- Dr. Md. Azadur Rahman Assistant Professor, Department of ENT Sylhet Women's Medical College, Bangladesh Email: azadurdrent@gmail.com Mobile: 01717-491397
   Dr. Mst.Tamanna Begum Medical Officer
- Sylhet Chest Disease Hospital Sylhet, Bangladesh3. Dr. Sudip Kanti Baishnab
- Indoor Medical Officer, Department of ENT Sylhet Women's Medical College, Bangladesh

\*For Correspondence

until the 1970s, ESS was not routinely conducted.<sup>1,2</sup> In fact, external methods like a headlight were used to treat sinus diseases.<sup>3</sup> Since the 1970s, new surgical instruments, imaging, simulation, and navigation technologies have been competing with technological advancements to influence how endoscopic sinus surgery is performed.

Messerklinger's research on mucociliary clearance and its part in the etiology of sinusitis served as the foundation for the idea underlying sinus surgery. In order to cure sinusitis, functional endoscopic sinus surgery (FESS) aims to increase the size of the sinus ostia, enhance mucociliary transport, and provide a better pathway for topical medications. The idea behind FESS may appear simple, but the anatomical variety, the wide range of illnesses it addresses, and the severity of each condition remain problems for the surgeon in every situation. Planning beforehand for sinus surgery is essential to getting the best outcomes and preventing any problems.<sup>4</sup>

Intranasal polyposis is one of the chronic upper airway disorders that affects the nose and paranasal sinuses and causes rhinosinusitis. Depending on the severity of the ailment and its psychological effects, rhinosinusitis has a variable influence on a person's quality of life.<sup>5,6</sup> In the middle meatus and osteomeatal complex, polyps are benign, soft, pedunculated, painless grape-like lumps that may develop on the mucosal lining of the nose and para-nasal sinuses. They affect around 4% of the general population.<sup>7,8</sup> The disease's specific etiology and pathophysiology are unknown, and several variables are believed to contribute to the development of nasal polyposis. Possible beginning factors include allergies, viral, bacterial, or fungal infections, which may accelerate the inflammation of the nasal mucosa and lead to the formation of polyps.9 Histology of nasal polyp lamina propria reveals greater numbers of inflammatory cells, including eosinophils, neutrophils, and lymphocytes, compared to healthy nasal mucosa. The disease's complexity makes its care more difficult, with a high propensity for recurrence.<sup>10</sup>

The diagnosis of nasal polyposis is based on the patient's medical history, physical exam, nasal endoscopy, and CT scan. CT is necessary and contributes to the treatment of polyposis. For unilateral nasal polyposis, further diagnostic investigations may be necessary.<sup>11</sup>

Medical care is the first line of defense. Different drugs have been tried to lessen nasal polyposis symptoms. Medical treatment is used to prevent the growth of polyps and preserve normal anatomy. Among the few methods used are topical and oral steroids, antihistamines, and macrolide antibiotics.<sup>12</sup> The best treatments for the symptoms include long-term topical nasal steroids, short-term oral steroids, and oral antihistamines.<sup>13</sup> In the case that medicinal treatment fails to eliminate the polyps, a variety of surgical procedures may be used, with the chance of recurrence following nasal polypectomy.<sup>14</sup> Functional endoscopic sinus surgery (FESS) has been used for the restoration of normal sinus airflow and drainage since its inception.

Pituitary tumors, chronic sinusitis, nasal polyps, and other nasosinus disorders are all treated by endoscopic sinus surgery. Due to its close closeness to the brain and other important structures and the limited visibility it provides inside the operating room, this procedure is difficult. To prevent issues that might be fatal, the anatomical landmarks should be kept in mind.<sup>15</sup> One of the most frequently used procedures nowadays for treating chronic sinus problems is functional endoscopic sinus surgery (FESS).

According to a study, there was a 36% recurrence of nasal polyposis after conventional polypectomy and a 12% recurrence following FESS.<sup>16</sup> Other results also showed similar results were 30% in conventional and 5% in FESS.<sup>17</sup> The appeal of traditional polypectomy is waning due to high recurrence.<sup>18</sup> According to a study, 14 out of 27 individuals who had nasal polyposis and chronic rhinosinusitis were still in need of surgery after 12 weeks of fluticasone propionate nasal drops therapy.<sup>19</sup> FESS has become a popular therapeutic option nowadays for nasal polyposis and chronic rhino sinusitis that do not respond to forceful medical intervention. With a mean follow-up duration of 31.7 years, Damm et al. showed that 85% of patients had improved quality of life.<sup>20</sup>

The aim of the study is to compare the efficacy and post operative complication between functional Endoscopic Sinus Surgery (FESS) with other conventional nasal polypectomy in the patients attending Sylhet Women's Medical College.

#### Materials & methods:

This comparative study was performed in Department of ENT, Sylhet Women's Medical College from March 2019 to March 2022. A total of 46 patients were selected through convenient sampling from age 18 and above. The research only included diagnosed cases of sinonasal polyposis between the ages of 18 and 50 of both genders. To control confounding, all recurring occurrences of nasal polyposis, nasal tumors, and individuals with a substantial deviation of the nasal septum were eliminated. The study's subjects provided signed, informed consent. Following the random number table approach, two groups were created: Group-A, which included 23 participants, received FESS, and Group-B, which included 23 patients, had conventional endoscopic endonasalpolypectomy. The patients were assessed using a questionnaire, a clinical examination, pre- and post-operative imaging, and up to six months of follow-up. The standard datasheet suggested for the current research contains all the information, including patient details, clinical assessment, pertinent investigations, surgical results, and postoperative follow-up. To provide a comparison study between FESS and intranasal polypectomy, results were compared and summarized. Following surgery, all patients were evaluated for effectiveness aftersix months (no recurrence of sinonasal polyposis).

Chi square test was applied to compare the significant difference regarding efficacy of both groups using SPSS 23 version. P-value of  $\leq 0.05$  was considered statistically significant.

#### **Results:**

In group A, the prevalence of recurrence was 30.43% whereas in group B, it was 73.90%. In group A, the efficacy rate was 69.56%, while in group B, it was 26.09%. The chi-square test showed a significant relationship between study group and efficacy, with a p-value of 0.006 (Table I).

Table I: Distribution of efficacy and recurrencecomparison among group A and group B

	_					
Efficacy	Gre	oup A	Gr	oup B	Total	P value
	n	%	n	%		
Yes	16	69.56	6	26.09	22	0.003
No	7	30.43	17	73.90	24	
Total		23		23		

From 46 patients, the minimum age was taken as 18 years and maximum age was found 48 years with mean $\pm$ standard deviation as 31.25 $\pm$ 7.41 years. In group A mean $\pm$ SD age was found out to be 29.39 $\pm$ 4.72, where 9 patients had efficacy among the age group of 25-45 and 3 patients had recurrence below the age of 25. In group B, the mean $\pm$ SD age was found as 36.48 $\pm$ 7.78 years where the maximum no of patients of 8 had recurrence above 45 years of age. No significant association was found between age and comparison groups.

There were 78 % male patients and 22% patients were female in group A and 70% male patients and 30% patients were female in group B. No significant association was found (Table II).

 
 Table II: Distribution of efficacy and recurrence among groups according to age

		Effi	cacy		
Variables	Grou	ір А	Grou	pBn	P value
	Yes	No	Yes	No	
Gender					
Male	12	6	5	11	0.98
Female	4	1	1	6	0.87
Age					
>25	5	3	2	3	0.234
25-45	9	2	4	6	0.218
45<	2	2	-	8	0.119

In the group with less than 1 year of disease duration, study group was significantly associated with efficacy (p = 0.021), however in the group with more than 1 year of disease duration, there was no significant association (p = 0.230) between study group and efficacy (Table III).

 Table III: Distribution of duration of disease in both groups

-					
Duration of	Group A		Group B n		P value
uisease	Yes	No	Yes	No	-
<1 year	11	4	2	7	0.021
≥1 year	5	3	4	10	0.230

#### **Discussion:**

In 1985, Kennedy originally used the term functional endoscopic sinus surgery. It is a method that uses an endoscope to restore normal nasociliary drainage and sinus ventilation. The most significant improvement in rhinology was the introduction of the rigid endoscope, which provides enhanced visualization of sinonasal anatomy. In FESS, ciliary regeneration is rapid compared to more extensive tissue loss, resulting in early drainage.<sup>16</sup> FESS is an effective treatment option for all patients of chronic rhinosinusitis with polyps that do not respond to conventional therapy, however polyps have a high recurrence rate, most likely due to scarring and constriction of the drainage routes of the osteomeatal complex.<sup>17</sup>

In our study the mean age of presentation of the disease was approximately as  $31.25\pm7.41$  years with range of 18 to 48 years with 73.9% male patients and 26.1% were female. In FESS, mean±SD age was found out to be 29.39±4.72 and in conventional plypectomy, the mean±SD age was found as 36.48±7.78 years. A previous study conducted by Humayun MP et al., found the mean age of patient in FESS was 45.43 years and in conventional surgery was 45.13 years and male female ratio was  $3.3:1^{18}$ . Another study revealed that the age at diagnosis is comparable to  $49.3\pm12.7$  SD $\square$  with 66.1% of cases being male.<sup>19-20</sup>

In our research, the recurrence rate for FESS was 30.43 %, while it was 73.90 % for conventional polypectomy. Similarly, the efficacy of FESS was found to be 69.56 % whereas that of traditional polypectomy was 26.09 %, were as high as 98%. Recurrence following FESS was 8%. Dalziel et al detected a recurrence of nasal polyposis in 35% of patients after polypectomy.<sup>21</sup>

The minimally invasive approach of FESS is utilized to restore sinus airflow and normal functionality.

Before endoscopic surgery, the anatomy should be shown via computed tomography.<sup>22</sup> FESS has fewer side effects and a lower recurrence rate than traditional polypectomy while also improving the signs and symptoms of polyposis and other sinonasal diseases. Due to the fact that polyps return more often in situations of more severe illness, the high incidence of disease recurrence is caused by the disease load.<sup>23</sup>

#### **Conclusion:**

FESS is much more effective than traditional intranasal polypectomy in the treatment of sinonasal polyposis. Age more than 30 years, female gender, and disease duration less than 1 year have a major impact on efficacy.

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**Original** Article

## Laryngeal Mask Airway Insertion: Intravenous Bolus Dose of Propofol vs Intravenous Equipotent Dose of Thiopentone

\*Haque KMM<sup>1</sup>, Saha SC<sup>2</sup>, Seraji SI<sup>3</sup>, Hossain AMD<sup>4</sup>

#### Abstract:

**Background:** A number of induction agents and combinations of these agents have been shown to be effective in facilitating the insertion of a laryngeal mask airway with little adverse effects. Patients having minor procedures requiring general anesthesia were randomly assigned to receive either propofol or thiopentone as an induction agent, with patients being blinded to which drug they received.

**Objective:** To compare thiopentone to propofol as a means of inducing anesthesia for LMA implantation after an appropriate induction with midazolam and fentanyl.

Materials & methods: This prospective comparative study was carried out at the Anaesthesiology and Critical Care Department of Holy Family Red Crescent Medical College. The randomized, double-blinded study comprised 200 patients aged 18 to 60 years undergoing minor surgeries ( $\leq$ 45 minutes) under general anaesthesia fitting into the American Society of Anesthesiologists (ASA) physical status I and II and Mallampati score (MPS) 1 and 2. The participants were randomly divided into two groups in a 1:1 ratio. Group A (n=100) received propofol (2.5 mg/kg), while group B(n=100) received thiopentone (5 mg/kg) injections for induction of anaesthesia. Pre-medication with midazolam (0.04 mg/kg) injection and fentanyl (1.5 mcg/kg) injection was provided to patients in both groups. Post-laryngeal mask airway insertion, parameters like conditions for insertion, time taken for laryngeal mask airway insertion, overall response, and haemodynamic parameters were recorded. The data analysis was executed using equivalence tests considering a two-sided p < 0.05 as significant. **Results:** The insertion ease was found to be significantly greater in Group A (p=0.029). There was a statistically significant difference (p 0.001) in the mean insertion time between the two groups. There was no statistically significant difference between the two groups in terms of the overall reaction to insertion. Reductions in heart rate and systolic and diastolic blood pressure were statistically different across the groups (p 0.001). **Conclusion:** Propofol at a rate of 2.5 mg/kg was found to be superior to thiopentone at a rate of 5 mg/kg as far as suppression of upper airway reflexes in laryngeal mask airway insertion.

Keywords: General anesthesia, Minor surgery, Thiopentone, Propofol, Laryngeal mask airway (LMA)

- Dr. K.M. Mozibul Haque Associate Professor, Department of Anesthesiology Holy Family Red Crescent Medical College, Dhaka Mobile: 018190272571 E-mail: drmozibul2023@gmail.com
- Dr. Samar Chandra Saha Assistant Professor, Department of Anesthesiology Holy Family Red Crescent Medical College, Dhaka
- 3. Dr. Shariful Islam Seraji Registrar, Department of Anesthesiology Holy Family Red Crescent Medical College, Dhaka
- Dr. A.M. Delwar Hossain Resident, Department of Anesthesiology Holy Family Red Crescent Medical College, Dhaka

#### \*For Correspondence

#### Introduction:

Endotracheal intubation is the most reliable method of securing the airway, delivering anesthetic gases, and preventing aspiration. However, during laryngoscopy and endotracheal intubation, hemodynamic changes and sympathoadrenal responses are common<sup>1</sup>. By offering some of the advantages of endotracheal intubation without the primary problem of sight and separating the cords by force, the laryngeal mask airway (LMA) was designed to minimize such unfavorable reactions<sup>2</sup>. Before inserting the LMA, the patient's upper airway reflexes must be carefully obtunded to prevent unfavorable responses as coughing, choking, and laryngospasm<sup>3</sup>.

Low-risk LMA insertion has been made possible by using a variety of induction agents and drug combinations. However, there are limitations to each of these approaches, and none of them has become a standard way4. However, propofol, the most often used medication to ease LMA implantation, is both costly and uncomfortable to administer. As the dosage increases, it lowers arterial blood pressure and slows breathing<sup>5</sup>. Finding a cheaper induction method that is just as effective as propofol<sup>6</sup> would be very helpful. Conversely, thiopentone may not suppress the airway reflex as well as propofol, leading to undesired phenomena such as choking, coughing, head and limb movement, and laryngospasm during LMA installation. No severe bradycardia or hypotension is produced, however. The work introduces several co-induction agents as a suitable replacement for LMA insertion<sup>7</sup>. The idea of co-induction in anaesthesia involves delivering tiny amounts of sedative or other anesthetic agents to reduce the dosage needed of the induction agent, hence enhancing anaesthesia quality, facilitating better haemodynamic stability, and reducing adverse effects.

Few studies have compared the effects of an IV bolus of propofol vs thiopentone for LMA placement. While there is a small body of literature comparing the two induction agents for LMA insertion, it is constrained by the use of the same adjuvants and equipotency ratio as this study. Therefore, the purpose of this study is to evaluate the relative safety and effectiveness of propofol and thiopentone during LMA insertion. Furthermore, thiopental is more economically viable than propofol in India, which might reduce the induction cost in childcare procedures. If our research with IV thiopentone and IV propofol finds similar or superior insertion circumstances for the LMA, then it makes sense to use the less costly medicine.

Therefore, the purpose of this research is to evaluate the efficacy of frequently used drugs thiopentone and propofol in their equipotent dose after the successful beginning of midazolam and fentanyl in facilitating LMA installation. It is our working hypothesis that intravenous thiopentone, in comparison to intravenous propofol, greatly improves the environment in which the LMA is inserted. The purpose of this research was to compare thiopentone to propofol as a means of inducing anesthesia for LMA implantation after an appropriate induction with midazolam and fentanyl.

To compare thiopentone to propofol as a means of inducing anesthesia for LMA implantation after an appropriate induction with midazolam and fentanyl.

#### Materials & methods:

From February 1, 2022, to January 31, 2023, researchers in the Anaesthesiology and Critical Care Department of Holy Family Red Crescent Medical College in Dhaka used a randomized, double-blind, parallel design to compare outcomes. One hundred and twenty patients of both sexes between the ages of 18 and 60 undergoing various elective minor surgeries (45 minutes) under general anesthesia were included in the study. These patients were classified as American Society of Anesthesiologists (ASA) grade I and II patients with Mallampati scores (MPS) of 1 and 2.

Patients with MPS 1 and 2 between the ages of 18 and 60 who were having elective minor procedures (less than 45 minutes) under general anesthesia were included in the research. Patients with cardiovascular, hepatic, renal, and upper respiratory tract infections, expected difficult airways, and pregnant cases were excluded, as were persistent smokers, hypertensive patients, patients with chronic obstructive pulmonary disease, bronchial asthma, diabetes, and medication allergies.

A total of 200 patients who matched the inclusion criteria were randomly assigned to one of two groups (A or B) using a computer-generated random selection of 40-person blocks for each group. Group A (propofol) and Group B (placebo) were secretly assigned using thick, sealed envelopes (thiopentone).

#### **Results:**

Table-I shows age distribution of the patients where 55% were belong to 50-60 years age group. followed by 20% belong to >60 years age group and 25% belong to <50 years age group.

Table-I: Age distribution of the patients

Age group	%
<50 years	25%
50-60 years	55%
>60 years	20%

Figure-1 shows gender distribution where majority were male 75%



**Figure-1: Gender Distribution** 

Table-II reveals LMA insertion conditions between the two groups where the number of patients with complete jaw opening was higher in group A (75%) than in group B (60%). However, no statistically significant distinction was documented between the groups (p <0.05). The LMA insertion was accessible in 95% of patients in group A. While in group B, 30% of patients presented difficulty in LMA insertion. The difference in ease of LMA insertion was significant between the groups. Only 2% patient in group B experienced mild coughing, whereas 4% in group A and 10% in group B experienced mild gagging. Laryngospasm was not observed in any of the patients. Mild movements were found in 10% and 13% patients in group A and group B, respectively. Except for ease of insertion, other LMA insertion conditions showed no significant difference between the two groups.

Conditions of LMA insertion	Grade	Description	Group A, %	Group B, %	P value	
	3	Full open	75%	60%		
Jaw opening	2	Partial open	25%	40%	0.54	
	1	Nil	0	0		
	3	Easy	95%	70%		
Ease of insertion	2	Difficult	5%	30%	0.029	
	1	Impossible	0	0		
	4	Nil	100%	98%		
Contin	3	Mild	0	2%	0.09	
Coughing	2	Moderate	0	0	0.98	
	1	Severe	0	0		
	4	Nil	96%	90%		
	3	Mild	4%	10%	0.00	
Gagging/swallowing	2	Moderate	0	0	0.33	
	1	Severe	0	0		
	3	Nil	100%	100%		
Laryngospasm	2	Partial	0	0		
	1	Severe	0	0		
	4	Absent	90%	87%		
	3	Mild	10%	13%	0.05	
Partial movement	2	Moderate	0	0	0.95	
	1	Severe	0	0		

1 adie-11: LMA insertion conditions between the two grou
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Table-III shows Time taken for LMA insertion between two groups where the mean time taken for LMA insertion was significantly higher in group B than in group A (p < 0.001).

 
 Table-III: Time taken for LMA insertion between two groups

	Group A,	Group B,	P
	mean ±SD	mean ±SD	value
Time taken for LMA insertion (in seconds)	14.20±3.10	16.17±2.4	<0.001

Table-IV shows overall responses to LMA insertion. In terms of overall conditions of LMA insertion, no statistically considerable difference was found between the groups (p > 0.05). In group A, no undesired responses occurred in 90% of patients compared to 86% in group B. Mild to moderate responses were encountered more in group B.

**Table-IV: Overall responses to LMA insertion** 

Response grades	Group A (n = 100)	Group B (n = 100)	P-value
Nil	90%	86%	
Mild	6%	9%	
Moderate	4%	5%	
Severe	0	0	

Table-V explains Sequential haemodynamic changes during LMA insertion where the baseline and pre-medication (pre-LMA) heart rates in the groups were similar (p-value for t-test >0.05). There was a decline in heart rate at the post-LMA at one minute, two minutes, and three minutes in both groups, although the reduction was noticeably greater in group A. The Student's unpaired t-test showed that the decline in heart rate in group A was highly significant than in group B at one, two, and three minutes post-LMA (p <0.001). Systolic, diastolic, and mean blood pressures were similar across the two groups, with a p-value of 0.05 or more at baseline and following pre-medication. However, after LMA, there was a decrease in systolic blood pressure (SBP), diastolic blood pressure (DBP), and mean blood pressure (MBP) in both groups, with the cases of group A experiencing a greater decline. The fall in SBP, DBP, and MBP at post-LMA at one minute, two minutes, and three minutes was statistically highly significant (p < 0.001).

Table-V: Seg	uential haemod	lvnamic changes	during LM	A insertion
		.,		

Variables	Croup	Pasalina	Dro I M A	Post-LMA (1	Post-LMA (2	Post-LMA (3
v al lables	Group	Dasenne	IIC-LIVIA	min)	min)	min)
	Group A <sup>#</sup>	$81.66 \pm 10.46$	$82.3\pm8.06$	$74.17\pm6.9$	$73.33\pm5.93$	$70.87\pm 6.01$
Heart rate	Group B <sup>#</sup>	$85.76\pm8.09$	$85.52\pm7.96$	$86.97\pm 6.80$	$85.09\pm 6.13$	$85.15\pm7.42$
	P-value	0.15	0.08	<0.001	<0.001	<0.001
	Group A <sup>#</sup>	$122.43\pm9.68$	$116.8\pm9.25$	$109.3\pm7.41$	$100.12\pm8.59$	$95.61\pm9.47$
SBP	Group B <sup>#</sup>	$122.52\pm7.85$	$117.77\pm8.7$	$117.07\pm6.01$	$115.02\pm7.28$	$111.98\pm7.27$
	P-value	0.96	0.63	<0.001	<0.001	<0.001
	Group A <sup>#</sup>	$80.15\pm8.42$	$73.74\pm8.22$	$69.58\pm7.56$	$63.17\pm7.62$	$61.35\pm6.54$
DBP	Group B <sup>#</sup>	$77.29 \pm 7.12$	$75.02\pm7.78$	$73.31\pm7.31$	$71.96\pm5.61$	$70.01\pm 6.02$
	P-value	0.11	0.48	<0.001	<0.001	<0.001
	Group A#	$93.13\pm8.19$	$88.94 \pm 6.87$	$82.38\pm8.24$	$75.7\pm6.18$	$72.31\pm5.8$
Mean BP	Group B <sup>#</sup>	$91.84\pm5.93$	$90.06\pm 6.28$	$88.84 \pm 4.5$	$85.97 \pm 5.14$	$84.02\pm7.51$
	P-value	0.43	0.46	<0.001	<0.001	<0.001

#### **Discussion:**

When administering general anesthesia, intubation of the trachea with the use of a tube is standard practice and provides a safe means of maintaining airway patency. In spite of this, both laryngoscopy and tracheal intubation trigger a stress reaction, manifesting as a reflex increase in sympathoadrenal activity. As a consequence, cardiac patients have potentially fatal dysrhythmias and elevations in heart rate and blood pressure. When complete intravenous anesthesia and volatile induction are employed for brief surgical procedures, face masks are often used throughout induction and maintenance. However, this method requires patients who are breathing on their own to retain the mask in place at all times.

LMA began to gain popularity as an alternative to endotracheal intubation and facemask because it results in fewer haemodynamic variations, is linked to a negligible increase in intraocular pressure, reduces the likelihood of sore throat, and frees the anesthesiologist's hands to perform other crucial tasks during surgical procedures. Surgery performed in a childcare setting may drastically save expenses in underdeveloped nations<sup>17</sup>. With LMA, patients had fewer problems and airway morbidity, leading to earlier discharges and shorter hospital stays<sup>18</sup>. This research aimed to compare and contrast the effectiveness of intravenous (IV) midazolam and intravenous (IV) fentanyl in preparing two groups of patients for LMA insertion under the prescribed pharmacological conditions.

Age, sex, weight, ASA and body mass index, as well as mental and physical wellbeing, were similar across the two groups. Multiple additional research<sup>5,14,19</sup> found results that were consistent with this one.

In the present investigation, more patients in group A had normal jaw movement than in group B. The difference, nevertheless, was not statistically significant (p >0.05). These findings are consistent with those of another research<sup>20</sup> that evaluated the circumstances of LMA installation in 70 patients who were not premedicated with midazolam, alfentanil, thiopentone, and propofol. Despite the lack of statistical significance for complete jaw opening, the clinical importance of the data is paramount<sup>21</sup>. Moreover, we found that there were substantial differences in the degree of difficulty in inserting the LMA across the groups. When comparing groups A and B, insertion of the LMA was much easier in group A (p 0.05). Many additional studies have shown the same results<sup>11,20</sup>. We found that the patients in our research group B were more likely to exhibit

symptoms such as coughing, choking, and patient movement. Another research had similar experiences<sup>4</sup>. Coughing, choking, and laryngospasm were more common in group B of a research comparing the effects of midazolam, alfentanil, and thiopentone for LMA placement to those of midazolam, alfentanil, and propofol. Other studies<sup>20</sup> corroborate the fact that these interpretations were not statistically significant. In our investigation, laryngospasm never occurred. Vandana et al. found that 1 in 12 patients in group B and 0 in group A had laryngospasm and airway obstruction. Our findings are supported by another research<sup>21</sup> that compared patients in group A without lignocaine spray to those in group B who were given the spray to make it easier to install the LMA.Patients in Group B required significantly longer (16.15 2.4) to implant an LMA (p 0.001) than those in Group A. Similar patients in group A and group B had day surgery with a mean interval of 16.6 (11.6) and a mean interval of 18.2 (12.8) seconds, respectively<sup>22</sup>. However, there was no statistically significant difference between the two groups.Group A had a higher rate of successful LMA insertion on the first try when combined with midazolam, whereas group B had a lower rate of successful LMA insertion on the first try;<sup>23</sup>). These findings were very similar to our own research.During and soon after LMA installation, Talwar et al. analyzed the hemodynamic changes in patients who were comparable to those in either group A or group B in the current investigation. Consistent with our results, they found that after implantation, heart rates and arterial blood pressure decreased in both groups, with a greater decrease in individuals in group A compared to group B<sup>11</sup>. Another research found that post-LMA heart rates and arterial blood pressures (systolic, diastolic, and mean) decreased after one minute, two minutes, and three minutes, even though baseline heart rates were similar across the two groups. Group A saw more reduction than Group B did. These results are very significant (p=0.0001) and corroborate the findings of our study<sup>24</sup>.

#### **Conclusion:**

Patients in group A who were given propofol had a much easier time inserting their LMAs. Less time is needed for the induction compared to the thiopentone group B patients. Group A patients, however, saw a decline in haemodynamic measures when compared to Group B patients.Midazolam, fentanyl, and propofol seem to be slightly superior than midazolam, fentanyl, and thiopentone for facilitating insertion of the LMA owing to their enhanced ease of insertion, shorter time needed for insertion, and better recovery profiles.

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The text of observational and experimental articles is usually (but not necessarily) divided into the following sections: Introduction, Methods, Results, and Discussion. This so-called "IMRAD" structure which is a direct reflection of the process of scientific discovery. Long articles may need subheadings within some sections (especially Results and Discussion) to clarify their content. Other types of articles, such as case reports, reviews, and editorials, probably need to be formatted differently. Authors need to work closely with editors in developing or using such new publication formats and should submit supplementary electronic material for peer review.

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