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Emphasize the new and important aspects of the study and the conclusion that follow from them. The detail data or other material given in the Introduction or the results section should not be repeated. The implications of the find-

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EDITORIAL

Russell's Viper Bite: Should We Panic?

Professor Dr. Quazi Arif Ahmed

Russell's viper has been named after Patrick Russell, a Scottish herpetologist. Russell's viper (*Daboia russelii*), is distributed erratically in 10 south Asian countries and is a leading cause of fatal snake bite in Pakistan, India, Bangladesh, Sri Lanka, Burma and Thailand. The recent outbreak of Russel viper in our country is a major cause of anxiety throughout the country.

Russell's viper is a venomous snake found in South East Asia including Bangladesh. It has a wide range of habitats including forests, agricultural areas, even in human settlements. Russell's viper is a large robust snake with potent venom, that can cause intense tissue damage even death in humans if not treated promptly. Due to its aggressive nature and tendency to strike when threatened, it has become the leading cause of snakebite incidence of the country.

Russell's viper has a greater impact in India due to the high number of incidents and resulting deaths and disabilities [1]. Its venom contains the major toxins found in viper venoms, with a predominance of phospholipase A2, serine and metalloproteases, and Kunitz-type serine protease inhibitors in most venom samples characterized using the venomics approach. Russell's viper venom is a rich source of bioactive molecules that act on the hemostatic system [2]. As a result, this venom is predominantly hemotoxic with prominent local effects, but it can also cause neurotoxic effects [3] and several different rare conditions such as renal, adrenal, and pituitary hemorrhages, rectus sheath hematoma, priapism, peripheral arterial thrombosis, and splenic rupture [4]. SBE with Russel's viper can also cause pulmonary thromboembolism which is a life-threatening medical condition [5].

Russell's viper plays a crucial role in our ecosystem maintaining the balance between wildlife and civilization. At the event of massive urbanization, Russell's viper is facing increasing threats to survival including global warming, habitat loss and indiscriminate killing due to fear and misunderstanding. The declining population of this species highlights the urgency of taking conservative measures to protect this end-angered reptile and maintain ecoological balance.

A series of stories have been making rounds on social media, of people dying in different parts of Bangladesh from the bite of the Russell's viper, a venomous snake. In these stories, many circulated by different media outlets, it's claimed that unlike most snakes, this one is hell-bent on biting people and even gives chase to do so. Articles and videos try to establish that the Russell's viper is not native to Bangladesh but is rather slithering its way here from neighboring countries. Apparently, the snake, which disappeared from the country at one point, has proliferated and is targeting farmers in the fields, and the available antivenoms can barely cure 20 percent of people.

Specific antivenom raised against poisonous snakes is now the most effective treatment. Monospecific or polyvalent antivenom raised against individual Russell's viper venoms have been noted to be highly effective for restoring blood coagulation functions and stopping spontaneous hemorrhage [6]. These antivenoms rapidly neutralize circulating

venom and protect animals and humans from the lethal effects of various components of Russell's viper venom.

Public education campaigns, training of health care providers regarding snakebite management and habitat conservation initiatives can all contribute to reducing negative attitude and at the same time fostering greater appreciation for these fascinating creatures.

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Original Article

Experience of VBAC in a Tertiary Level Government Hospital

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Abstract

Background: Vaginal birth after cesarean section (VBAC) for a non-recurring indication has been described by several authors as safe & having a success rate of 60-80%. VBAC increases the possibilities of subsequent vaginal deliveries & reduces the rate of repeat cesarean section with associated postoperative morbidity. **Objective:** To estimate the success rate & risks of an attempted vaginal birth after one cesarean delivery (VBAC). **Methods:** This was a cross sectional descriptive study conducted Satkhira Medical College Hospital (SMCH) between the periods of January 2022 to September 2023. Total 535 patients were admitted with history of prior caesarian section (CS) in this study. Among them we enrolled 58 cases following inclusion and exclusion criteria. **Results:** Out of 58 cases enrolled in the study, 46 (79.31%) successfully delivered vaginally without any complication. Twelve (20.68%) cases needed repeat cesarean section and among the 12, 3 (5.17%) cases had to undergo emergency cesarean section for scar tenderness, those were found to be uterine scar rupture. **Conclusion:** Vaginal birth after caesarian section (VBAC) can be offered to pregnant women without contraindication.

Keywords: Vaginal Birth after Caesarian Section (VBAC), Trial of Labor after Caesarian Section (TOLAC), Lower Segment Caesarian Section (LSCS).

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Introduction

A trial of labor after cesarean (TOLAC) is a planned attempt to labor by a woman who has previously undergone one caesarean delivery and desires a subsequent vaginal delivery. A VBAC is a "successful" trial of labor resulting in vaginal birth and a TOLAC may results in either a "successful" VBAC or a "failed" trial of labor resulting in a repeat caesarean delivery [1-3]. Vaginal birth after cesarean section (VBAC) is one of the strategies developed to control the rising rate of cesarean section (CS) [4]. It is a trial of vaginal delivery in selected cases of a previous CS, which is based upon the assessment of scar integrity, fetal wellbeing and improved facilities of emergency CS [5]. With present techniques and skill, the incidence of cesarean scar rupture in subsequent pregnan-

cy is very low. The rate of successful vaginal delivery after prior CS is found to be 60%-80% [6]. Women with prior vaginal delivery are found to have higher success rates [7, 8]. The American college of obstetrician and gynecologist (ACOG) estimated that the risk of uterine rupture in women with a previous CS and concluded that the lower segment caesarean scar has a minimum risk (0.2-1.5) of rupture during vaginal delivery [9]. Women entering labor spontaneously have higher success rates as well, compared to women undergoing induction of labor. The present study was undertaken to estimate the success rate & risks of an attempted vaginal birth after one cesarean delivery (VBAC).

Methods

This was a cross sectional descriptive study conducted Satkhira Medical College Hospital (SMCH) between the periods of January 2022 to September 2023. Total 535 patients were admitted with history of prior caesarian section (CS) in this study. Among them we enrolled 58 cases following inclusion and exclusion criteria. Inclusion criteria were women with previous 1 (one) cesarean section, singleton pregnancy, cephalic presentation and term gestation. Exclusion criteria were history of 2 or more cesarean section and previous uterine surgery e.g. myomectomy & classical cesarean section. All cases and their close relatives were explained about the advantages of VBAC over elective cesarean section. Also they were explained about the risk of scar dehiscence and the need of emergency cesarean section. All cases were monitored carefully during labor by continuous electronic fetal monitoring. The trial was terminated by emergency cesarean section, if there was partograph based evidence of unsatisfactory progress, scar tenderness and fetal distress.

Results

Among the 535 patients who admitted with history of prior CS, we enrolled 58 cases following inclusion and exclusion criteria. Patient's profile is shown in table 1 while indications of repeat CS in cases of failed trial of VBAC is shown in table 2. Association of type of onset of labor with mode of delivery is presented in table 3 and association of history of vaginal delivery before LSCS with outcome of VBAC-TOLAC is shown in table 4. In figure 1, frequency of mode of delivery is shown.

Discussion

Planning a trial of labor after cesarean section requires typical prenatal care with additional counseling regarding the option of TOLAC versus PRCD (planned repeat caesarean delivery). Additionally, early USG to confirm gestational age can be helpful if cesarean section is scheduled. Cesarean section should only be conducted when medically necessary.

Since 1985, the international healthcare Community, has considered the ideal rate for cesarean section to be between, 10% and 15%. Since then, CS have become increasingly common in both developed and developing countries. When medically justified CS can effectively prevent maternal perinatal Morbidity and mortality. However, there is no evidence showing the benefits of CS for them who do not require the procedure. On the other way CS is associated with, short and long term risks which can extend many years beyond the current delivery and affect the health of the women, her child and future pregnancy [10].

This study represents observations for a period of 21 months. The selection of women for VBAC is influenced by women's desire and conditions favorable for vaginal delivery. In this study primarily 535 women were admitted with previous 1 cesarean section, where elective cesarean section were performed in 188

Table I. Patient profile of the study subjects (n = 58).

Parameters		Vaginal delivery n1 = 46 n (%)	Caesarean section n1 = 46 n (%)	Total	*p* value
Age (years)	20-30	37 (80.43)	9 (75)	46	<0.05^s
	31-40	9 (19.56)	3 (25)	12	<0.05^s
Parity	1	31 (67.39)	3 (25)	34	<0.05^s
	2	9 (19.56)	5 (41.66)	14	>0.05
	3	5 (10.86)	3 (25)	8	>0.05
	4	1 (2.17)	1 (8.33)	2	>0.05
Gravida	2nd	28 (6.08)	6 (50)	34	<0.05^s
	3rd	9 (19.56)	5 (41.66)	14	<0.05^s
	4th or above	6 (13.04)	4 (33.33)	10	>0.05

Fisher's exact test and Chi square test were done to get the p value.

Table 1 is presenting the patient's profile participated in this study. Majority of the patients were within the 20-30 years age group in both vaginal delivery (80.43%) and in cesarean section (75%) group which was statistically significant. Primiparous and 2nd and 3rd gravida patients had more statistically significant vaginal delivery.

Table II. Indication of repeat LSCS in cases of failed trial of VBAC (n=12).

Indication	Frequency n (%)
Fetal distress	4 (33.33)
Cervical dystocia	1 (8.33)
Scar tenderness	3 (25)
Persistent occiput posterior position	2 (16.66)
Failed progress of labor	2 (16.66)

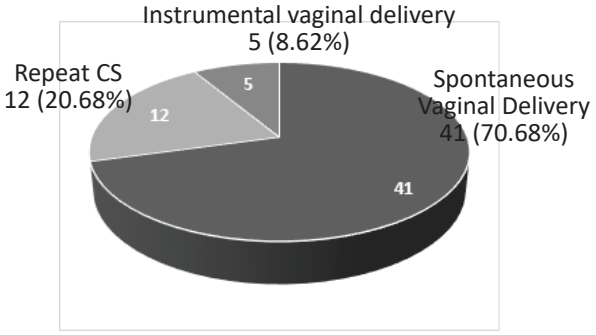

Figure 1 is showing that majority (70.68%) of the cases Spontaneous vaginal delivery was done successfully. In 12 (20.68%) cases repeat LUCS was done and in another 5 (8.62%) cases of Instrumental vaginal delivery were conducted.

Table III. Association of types of onset of labor with mode of delivery (n = 58).

Types of onset of labor	Vaginal delivery n (%)	Caesarean section n (%)	Total	*p* value
Spontaneous onset of labor	29 (63.04)	3 (25)	32	<0.05^s
Induction of labor	17 (36.95)	9 (75)	26	<0.05^s

Chi square test was done to get the p value.

Association of type of onset of labor with mode of delivery is presented in table 3. Significant association was found between type of onset of labor and mode of delivery (p value: <0.05).

Table IV. Association of history of vaginal delivery before LSCS with outcome of VBAC-TOLAC (n = 58).

History of vaginal delivery before LSCS	Vaginal delivery	Caesarean section	Total	*p* value
Yes	9	3	12	<0.05[s]
No	37	9	46	<0.05[s]

Fisher's exact test was done to get the p value.

Table 4 is showing that significant association was observed between of history of vaginal delivery before LSCS with outcome of VBAC-TOLAC (p value: <0.05).

(35.14%) cases which corresponds with Akter (2021) [11] study in Bangladesh, that showed vaginal delivery was 68% and caesarian delivery was 32%. The most important factor that prevents obstetricians from allowing women to undergo vaginal delivery following cesarean section has been the fear of uterine rupture or silent scar dehiscence. In the present study most of the women of vaginal delivery 46 (79.31%) and caesarian section 12 (20.68 %) had intact uterine scar. Rupture was detected only in 2 (16.66%) during cesarean section. Similar observation was found in the study of Akter [11]. The incidence of scar rupture was 0.5% in Parveen et al [3]. In Sultana's study done in the year 2000, rate of scar rupture was 4.5%, per-operatively 2 cases of scar rupture were found (5.41%) [12].

According to patient profile majority of patients were within 20-30 age group in both vaginal delivery (80.43%) and caesarian section (75%) group. in current study women belonging to higher socioeconomic status were very much keen for VBAC, which is not similar to the study of Rahman et al (2013) [13].

Regarding maternal and fetal outcome in all 46 (79.31%) women of successful vaginal birth group, there was no mortality. In the present study, suitable women were selected for VBAC with adhering to strict inclusion and exclusion criteria, as mentioned earlier. Of the 58 women 56 (79.21%) delivered vaginally and 12 (20.68%) underwent emergency lower segment cesarean section (LSCS) for various indication as given in table 3. Among 12 women who had one previous vaginal delivery, 9 delivered vaginally in the present study and 3 underwent LSCS. Where's in the study of Rahman et al. (2013) [13] with history of prior vaginal delivery cases delivered vaginally. It means that the history of normal vaginal delivery is the single most important predictor for a successful VBAC. Patient with prior CS needs special management both antenatal, in labor and delivery. We know that many women can safely and successfully have a VBAC. Current evidence indicates that 60-80% women can achieve a vaginal delivery following a previous lower uterine segment cesarean section.

Conclusion

From the above study it could be concluded that, TOLAC is effective in case of VBAC which can reduce the frequency and complications of LSCS.

Recommendation

Selection of cases for VBAC should be accurate. Spontaneous entry into labor is preferred. Continuous fetal heart rate monitoring is essential. Repair of undetected dehiscence of uterine scar is not required unless there is ongoing bleeding.

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Original Article

Comparison of Post-operative Hemorrhage in Tonsillectomy Done by Bipolar Diathermy and Cold Steel Dissection Method

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Abstract

Introduction: Tonsillectomy is the single most common operation performed in Ear, Nose and Throat Department. Various methods of tonsillectomy have been practiced over the century aimed at reducing or eliminating intraoperative and postoperative morbidity. Due to multiple source of blood supplying received, intraoperative bleeding is the most difficult problem and securing it is time-consuming. The time taken to control the bleeding would invariably determine the length of operation. Common post-operative complications are bleeding and pain. **Objectives:** To compare the result of bipolar diathermy assisted tonsillectomy with those of cold steel blunt dissection technique with regards to operative time, per-operative blood loss, post- operative pain, post-operative hemorrhage and post-operative healing. **Methods:** This was a prospective comparative study conducted in 60 patients admitted into the department of Otolaryngology and Head-Neck Surgery, BSMMU, Dhaka over the period of March 2012 to August 2012, diagnosed as recurrent tonsillitis or obstructive tonsils. **Results:** Per-operative bleeding was less in tonsillectomy by using bipolar diathermy (mean 10.1 ml) compared with cold steel blunt dissection (mean 13.4 ml). It was also revealed that postoperative reactionary hemorrhage rate was higher in cold steel blunt dissection group. However, secondary hemorrhage rate was higher in bipolar diathermy group than cold steel blunt dissection group. **Conclusion:** This study revealed a significantly less intraoperative or postoperative hemorrhage and morbidity in bipolar diathermy in comparison with cold steel blunt dissection.

Keywords: Tonsillectomy, bipolar dissection method, cold steel dissection method, hemorrhage.

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Introduction

Tonsillectomy is the surgical procedure to remove the tonsils from tonsillar fossa. It is recommended in patients with repeated attacks of acute tonsillitis (7 or more attacks in one year, 5 or more episodes in previous two years), peritonsillar abscess, obsructed tonsil causes sleep apnea syndrome and suspicion of malignancy in unilateral hypertrophy of tonsil [1, 2]. Under general anesthesia extra capsular or the standard tonsillectomy is performed involving removal of tonsils along with capsule. Ligature or diathermy is used to secure haemostasis [3]. The peroprative and post-operative hemorrhage as well as severe post-operative pain resulting in odynophagia are the most important complications of tonsillectomy. Ear pain, dehydration due to poor intake, fever and airway obstruction may arise as a postoperative complication [4].

Cold steel dissection, monopolar and bipolar electrocautry, KTP laser, ultrasonic dissector coagulator, coblation and thermal welding have been described for various procedures of tonsillectomy. There remains debate as to the optimal method with the least patient morbidity. Two of the most common dissection techniques in the United States and even in Bangladesh are cold dissection and electrocautry dissection. Since 1930 electrocautery has been used as common practice during tonsillectomy. Electrocautry usage became common with general inhalation anesthesia after the advent of non-explosive mixtures [5].

Minimal blood loss and a short operating time shows in electrocautery tonsillectomy with a monopolar blade because simultaneous bleeding control and tissue dissection are possible. Late post-operative pain and delayed wound healing are reported in diathermy tonsillectomy than conventional cold steel tonsillectomy. These complications are due to the thermal tissue damage caused by temperature that reach 300°C. As compare to monopolar cautery, bipolar electrocautery causes much less surrounding tissue injury and is said to be superior in terms of per-operative bleeding, operative time, early post-operative pain and morbidity after tonsillectomy [6].

The tonsil is removed as well as haemostasis secured simultaneously by diathermy. Diathermy is used to incise the mucosa and divide the strands of tissue that bind the tonsil to the pharyngeal wall. At the same time the vessels that run in these strands are visualised and can be coagulated before they are divided, in theory minimizing blood loss and speeding up the operation by 40% (Roy 1976) to 50% [7]. A further refinement of this technique uses the operating microscope to facilitate dissection and the identification of the glossopharyngeal nerve, said to be an important source of referred otalgia after tonsillectomy [8].

The most important potential complications of tonsillectomy are bleeding and pain. The operating surgeon may be more concerned about bleeding but for the patient pain is likely to be the most important issue.

This study was undertaken in an attempt to compare the techniques of bipolar electrocautery and cold steel dissection tonsillectomy. Details about post-operative pain, secondary hemorrhage, per-operative blood loss and operative time were sought with a hypothesis that bipolar diathermy tonsillectomy is relatively safe and effective method in addition to cold steel blunt dissection method.

Methods

This was a prospective comparative study conducted in 60 patients admitted into the department of Otolaryngology and Head-Neck Surgery, BSMMU, Dhaka over the period of March 2012 to August 2012, diagnosed as recurrent tonsillitis or obstructive tonsils. We divided the study subjects into group A (subjects operated by bipolar diathermy) (n=30) and group B (subjects operated by cold steel blunt dissection (n=30). All the data were checked and edited after collection. Then the data were entered into computer and statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-22). The results were presented in tables and figures. In each group, calculation for the continuous variables [mean, standard deviation, no of observations], frequency were calculated in percentage (%). Statistical significance was set at $p<0.05$ and confidence interval was set at 95% level.

Results

It is a prospective comparative study done in the Department of Otolaryngology and Head-Neck Surgery at Bangabandhu Sheikh Mujib Medical University, Dhaka. 60 patients

recruited in this study, 30 patients were in the bipolar diathermy group and another 30 patients were in the cold steel blunt dissection group.

Age and sex distribution of the patients are shown in table 1 which shows that, the distribution is not statistically significant. The operative time and intra-operative blood loss between two groups are shown in table 2 which shows operative time (minutes) and intra-operative blood loss (ml) is significantly less in cold steel blunt dissection group than in bipolar diathermy group. In table 3 comparison between post-operative hemorrhages in patients is shown. It was revealed that postoperative reactionary hemorrhage rate was higher in cold steel blunt dissection group. However, secondary hemorrhage rate was higher in bipolar diathermy group than cold steel blunt dissection group. During follow up period, no other major or minor complications occurred in our study.

Table I. Age and sex distribution of the study subjects (n=60).

Variables	Group A (n=30)	Group B (n=30)	*p* value
Age (years) (Mean ± SD)	18.78 ± 6.57	16.54 ± 5.74	0.168
Male n (%)	21 (70)	19 (63.3)	>0.05
Female n (%)	9 (30)	11 (36.7)	

Unpaired Student's 't' test was performed to compare between groups.

Table II. Comparison of operative time and intra-operative blood loss between two groups (n=60).

Variables	Group A (n=30)	Group B (n=30)	*p* value
Operative time (minutes)	12.4 ± 6.3	25.3 ± 8.6	<0.001[s]
Intra operative blood loss (ml)	10.1 ± 2.3	65.2 ± 13.4	<0.001[s]

s = significant

Unpaired Student's 't' test was performed to compare between groups.

Table III. Comparison between postoperative hemorrhage in patients (n=60).

Post-operative hemorrhage	Group A (n=30) n (%)	Group B (n=30) n (%)
Reactionary hemorrhage	1 (3.3)	2 (6.7)
Secondary hemorrhage	2 (6.7)	1 (3.3)

Discussion

Tonsillectomy is the most frequently operative procedure performed in Otolaryngolog. Cold steel blunt dissection technique is still considered a most common and standard method of tonsillectomy. Before going to perform any other tonsillectomy one has to be master in cold steel method. Now, in Bangladesh using of bipolar diathermy day by day is increasing. Though the sample size of this study is small, will give some ideas about the application of bipolar diathermy in tonsillectomy. Various methods have been described which are frequently compared and discussed in otolaryngology literature [9]. Cold steel blunt dissection tonsillectomy is usually preferred because the healing is more rapid and post-operative pain less than other techniques [10-13]. Those who are studied various method of tonsillectomy, usually they have compared to the standard blunt dissection technique. The value of a new technique must be judged by the results concerning intra-operative and postoperative morbidity and complications. The most common postoperative concerns following tonsillectomy are hemorrhage and pain. Postoperative pain is the most significant subjective symptoms as far as patient is concerned.

In the present study, the self-paired comparison between cold steel blunt dissection and bipolar diathermy techniques reduced bias and increased precision of the study. Factors influencing the outcomes might not be equal in unpaired groups, such as age, tonsil size and

degree of infection, concomitant medication and surgical indication. The mean age was 18.78 years for bipolar diathermy group and 16.54 years for cold steel blunt dissection group (Table 1). The mean difference of age is not statistically significant. Incidence in male is more in both. No significant difference was seen in sex distribution between two groups. Ahmed et al. [14] showed the mean age of the patients 15.8 years (SD = 9.4 years) ranging from 4-49 years. Of these 200, 111 (55.5%) were male and 89 (44.5%) were female.

In present study the operation time was shorter with the bipolar diathermy than cold steel dissection method. The mean operative time for bipolar diathermy group was 12.4 ± 6.3 minutes and 25.3 ± 8.6 minutes for dissection group (Table 2). The time being less needed in the bipolar diathermy group and the difference was statistically significant ($p<0.001$). In accordance with the present study Vthayathil et al. [15] the operative time and intraoperative blood loss were found to be significantly less in the bipolar diathermy method. In a series of study by Blomgren et al. [16], on electro-dissection tonsillectomy, they conclude that this technique was fast and resulted in little intraoperative bleed. These findings may be attributed to the ability of diathermy to dissect the tonsils and coagulate the blood vessels simultaneously.

In present study, it was revealed that postoperative reactionary hemorrhage rate was higher in cold steel blunt dissection group (6.7%) than bipolar diathermy (3.3%) (Table 3). However, secondary hemorrhage rate was higher (6.7%) in bipolar diathermy group than cold steel blunt dissection group (3.3%). During follow up period, no other major or minor complications occurred in our study. Late onset pain and delayed return to normal diet in patients of bipolar electrocautry group likely resulted in higher incidence of secondary hemorrhage. Ali et al. (2014) [17] demonstrated the incidence of secondary haemorrhage was 5.6% and 3.06% in bipolar electrodissection and cold steel dissection groups respectively. This is supported by a study conducted by Gendy, where secondary hemorrhage was higher in the electrodissection technique 2.3% (12 patients) compared to 1% (6 patients) of the cold dissection technique [18].

Conclusion

From the above study it could be concluded that, bipolar diathermy method of tonsillectomy is an effective safe and rapid method with obvious advantages of less operative time and minimum per-operative blood loss. It has some disadvantages of late onset of pain and higher incidence of secondary hemorrhage. However it can be used in children with less blood reservoir and in heavy operation waiting cases.

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Original Article

Association of Platelet-Lymphocyte Ratio (PLR) with Prediabetes and Type-2 Diabetes Mellitus

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Abstract

Background: Complications associated with insulin resistance or deficiency are closely related to systemic inflammation. Recently Platelet-Lymphocyte Ratio (PLR) has been used as a marker of the systemic inflammatory process in chronic diseases. PLR is a widely available cost-effective hematological parameter and can be used in the prediction of diabetes-related complications. **Objectives:** The present study aimed to explore the association of PLR with the glycemic status of pre-diabetes and type 2 DM in comparison to normal healthy adults. **Methods:** In this cross-sectional study, a total of 105 study subjects were included. Fasting plasma glucose (FPG), 2 hours after 75gm glucose load (2 hrs PG), HbA1c, and complete blood count (CBC) tests were performed. Then the study subjects were categorized into Group-1 (Normal healthy adult), Group-2 (Pre-diabetes), and Group-3 (Diabetes) according to WHO criteria. Each group contains 35 study subjects. Data (collected in a preformed data sheet) were analyzed by SPSS Version 22-0. Comparison of various parameters was done by Chi-Square test, ANOVA test, and Kruskal-Wallis test followed by post-hoc test. Spearmen correlation coefficient test was done to see the correlation of PLR with glycemic status (FPG, 2 hrs PG, and HbA1c). **Results:** Age and sex were not statistically significant. Median values of PLR were significantly lower in Group-2 and Group-3 than Group-1 with a p-value ($p<0.001$). PLR showed a negative correlation with FPG, 2hrs PG, and HbA1c in Group-2 with p-value (0.006, 0.021 & 0.007 respectively). PLR was also negatively correlated with FPG, 2hrs PG, and HbA1c in Group-2 with p values (0.046, 0.024 & 0.005 respectively). However, Group-1 showed no significant correlation with PLR. **Conclusion:** This study showed that PLR was lower in both pre-diabetes and type 2 DM with a negative correlation. It can be used in the prediction of dysglycemia-related complications in the future.

Keywords: Platelet-Lymphocyte Ratio (PLR), Prediabetes, Type-2 Diabetes.

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Introduction

Diabetes mellitus (DM) is a non-communicable chronic inflammatory disorder. Absolute or relative deficiency of insulin is the basic mechanism for dysglycemia (pre-diabetes & diabetes) [1]. Pre-diabetes is the intermediate metabolic stage of glucose including mainly two conditions, impaired level of fasting glucose (IFG) showing glucose value ranging from 110 mg/dl to 125 mg/dl (6.1-6.9 mmol/l) and impaired glucose tolerance (IGT) where glucose levels range from 140 mg/dl to 199

mg/dl (7.8-11.0 mmol/l). Glycated hemoglobin (HbA1c) ranges from 5.7% to 6.4% also considered a pre-diabetes condition (ADA, 2018). Previous studies reported that maximum cases (up to 70%) of pre-diabetes eventually develop overt diabetes during their lifetime. A recent estimation by WHO showed, 422 million people are affected by diabetes globally with an 8.5% prevalence rate [2, 3]. Oral glucose tolerance test (OGTT) and glycated hemoglobin (HbA1c) are used for diagnosis of dysglycemia.

Dysglycemia is a slowly progressive disorder involving multiple organs. Moreover, due to a lack of early diagnosis and proper follow-up, individuals with dysglycemia are at increased risk of micro and macro-vascular complications. A sedentary lifestyle, unhealthy diet, obesity, high blood pressure, and inadequate physical activities play an important role in the pathogenesis of dysglycemia and associated complications. Early diagnosis or identification is considered to be the best strategy to minimize the burden of dysglycemia and associated complications in the general population [3]. Excessive production of chronic inflammatory mediators such as interleukin-1 (IL-1), interleukin-6 (IL-6), C-reactive protein (CRP) & tumor necrosis factor-alpha (TNF-α) in dysglycemia is directly associated with microvascular (retinopathy, nephropathy, and neuropathy) and macrovascular (myocardial infarction, stroke, and lower extremity ischemia) complications.

PLR was found to be strongly correlated with inflammatory markers (including IL-1, IL-6, TNF-α, and CRP) and endothelial dysfunction which play a basic role in the pathogenesis of type 2 DM and complications associated with hyperglycemia [2, 4]. PLR has been proposed as a novel inflammatory marker for several cardiac, rheumatologic, and neoplastic conditions. The platelet-to-lymphocyte ratio (PLR) is the ratio of the absolute count of platelets to the absolute count of lymphocytes. Normal PLR values in an adult range from 36.63–149.13 [5, 6]. Although disease-specific biomarkers have been identified, most of them are more expensive and time-consuming [7]. PLR is a sensitive, cheap, readily available indicator of any inflammatory disorder. Moreover, PLR is superior to other leukocyte parameters (Platelets, lymphocytes, and total leukocyte counts) because it represents two parameters, and is less influenced by physiological, and physical factors [8, 9]. Therefore, the present cross-sectional study is designed to explore the association of PLR with the glycemic status of pre-diabetes and type 2 DM.

Methods

This Cross-sectional study was carried out in the Department of Biochemistry & Molecular Biology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from 1 March 2021 to 28 February 2022. A total of 105 were selected by purposive sampling as study subjects. Patients with newly detected and untreated type 2 DM, pre-diabetes, and individuals, who were willing to participate in this study as normal healthy adults were included as study subjects. Pregnant women, individuals with clinical evidence of acute inflammatory conditions, and individuals with type 2 DM due to secondary causes (other endocrine disease) were not included in this study. The objectives and operational procedures of this study were painstakingly explained and informed written consent was taken. Relevant data were collected by using a preformed data collection sheet. Blood samples were collected according to the standard protocol used by BSMMU. FPG and 2 hrs PG were done by the Glucose oxidase (GOD-PAP) method (Keston, 1956) using an Atellica CH (clinical chemistry) analyzer (Siemens Healthcare Diagnostics Inc., NY, USA). Estimation of HbA1c was done by Capillary electrophoresis method by using (Capillarys 2 flex-piercing system) Sebia Capillary analyzer. Complete

blood count results were obtained from the Sysmex XN-2000 automated hematology analyzer machine. Platelet-lymphocyte ratio (PLR) was calculated from CBC. Then the subjects were categorized into Group 1 (Normal healthy adult), Group 2 (Pre-diabetes), and Group 3 (Diabetes) based on their glycemic status by following WHO criteria. Thirty-five study subjects were taken in each Group. Software Statistical Package for Social Science SPSS 22.0 was used in data analysis. Continuous outcome variables were expressed as mean ± SD, median, interquartile range (IQR), minimum, and maximum value, whereas, categorical outcome variables were presented as percentages. The chi-square test was done for the comparison of categorical outcome variables, and the comparison of continuous outcome variables was performed by ANOVA test and Kruskal-Wallis test followed by a post-hoc test. Spearmen correlation coefficient test was also done to express the correlation of PLR with glycemic status (FPG, 2hrs PG, and HbA1c) among the three groups. A p value <0.05 was considered as statistically significant.

Results

In this study, the age distributions of study subjects were presented in mean ± SD, and an ANOVA test was done to measure the level of significance. There was no statistically significant difference in age among the three groups (p=0.510). A Chi-square test was done to measure the level of significance in gender distribution. No significant differences in gender were found among all the three groups (p=0.464).

Discussion

The relationship between systemic inflammation and insulin deficiency or resistance (dysglycemia) has been established by several studies, in which an altered immune system plays a major pathologic role [10, 11]. Recently the PLR has been used as a marker of systemic inflammatory processes in chronic diseases [12]. The present study aimed to see the association of PLR (Platelet-lymphocyte ratio) with pre-diabetes and type 2 DM. In this study, based on glycemic parameters including fasting plasma glucose (FPG), 2 hours after 75 gm glucose load (2 hrs PG) and HbA1c, study subjects were categorized into Group-1 (normal healthy adults), Group-2 (pre-diabetes) and Group-3 (diabetes). Each group consists of 35 study subjects. The mean ± SD of the age of the three groups were 44.80 ± 7.2, 45.31 ± 9.46, and 47.20± 10.20 respectively. The differences in mean age were not statistically significant (p > 0.05). The gender distribution showed 70% female and 30% male in the study groups. There were no statistically significant differences in gender distribution among the three study groups (p > 0.05). This observation was consistent with several recent studies [3, 5]. In the current study, median values of PLR were 120.16 in Group-1, 93.95 in Group-2 and 91.50 in Group-3. Median values of PLR were lower in Group-2 and Group-3 in comparison to Group-1 which was statistically significant (p<0.001). These findings are supported by several recent studies [5, 6]. Lower PLR is related to increased activation and platelet aggregation in patients with type 2 DM. This is due to decreased insulin secretion, which has the role of inhibiting platelet aggregation, oxidative stress, and endothelial damage from glucotoxicity [1]. Correlation results of this study showed PLR was negatively correlated with FPG (rs= -0.452, P=0.006); 2 hrs PG (rs= -0.388, P=0.021) and HbA1c (rs= -0.450, P=0.007) in Group-2. Group-3 also showed a negative correlation of PLR with FPG (rs= -0.339, P=0.046); 2 hrs PG (rs= -0.382, P=0.024) and HbA1c (rs= -0.462, P=0.005). This observation was consistent with the findings of some recent studies [1, 5]. PLR has been reported to have a predictive effect on type 2 DM and its related complications in recent years [12].

Table I. Distribution of the study subjects according to hematological variables (n=105).

Hematological Variables		Group-1 (n = 35)	Group-2 (n = 35)	Group-3 (n = 35)	*p* value
PLR	Median	120.16	93.95	91.50	<0.001
	IQR	42.56	44.48	33.61	
	Min-max	72.68 -149.04	59.56 -138.89	48.13 -118.42	

PLR data were expressed in the median, interquartile range (IQR), minimum and maximum value. The Kruskal-Wallis test was done to measure the level of significance. Table I showed the median values of PLR were statistically significant among the groups with p-value <0.001.

Table II. Comparison of PLR in between the groups.

Parameter	Group	Parameter value	*p* value
PLR	Group-1 vs Group-2	120.16 vs 93.95	0.033
	Group-1 vs Group-3	120.16 vs 91.50	<0.001
	Group-2 vs Group-3	93.95 vs 91.50	0.008

Kruskal-Wallis test followed by a post-hoc test was done to measure the level of significance in comparison of PLR between the groups. Table II showed median values of PLR were lower in Group-2 and Group-3 in comparison to Group-1 with p-values (0.033 & <0.001 respectively).

Table III. Correlation of PLR with glycemic status (n=105).

Parameters	Group-1 (n = 35)		Group-2 (n = 35)		Group-3 (n = 35)	
	r^s	*p* value	r^s	*p* value	r^s	*p* value
Fasting plasma glucose	-0.131	0.453	-0.452	0.006	-0.339	0.046
Plasma glucose 2 hrs after 75gm glucose load	-0.089	0.611	-0.388	0.021	-0.382	0.024
HbA1c	-0.108	0.535	-0.450	0.007	-0.462	0.005

A Spearmen correlation coefficient test was done to measure the level of significance. In Table III, PLR showed a negative correlation with fasting plasma glucose (FPG), 2 hours after 75gm glucose load (2 hrs PG), and HbA1c in Group-2 with p-values (p =0.006, 0.021, and 0.007 respectively). Also, PLR was negatively correlated with fasting plasma glucose (FPG), 2 hours after 75gm glucose load (2 hrs PG), and HbA1c in Group-3 with p-values (p =0.046, 0.024 and 0.005 respectively). However, no significant correlation was found in Group 1.

Conclusion

This study concluded that PLR was lower in Group-2 (pre-diabetes) & Group-3 (type 2 DM), and showed a negative correlation with glycemic status. PLR is a proven indicator of systemic inflammation. Moreover, this hematological parameter is widely available, inexpensive, and reliable, that is why it can be used in the prediction of dysglycemia-related complications in the future so that effective measures can be taken to prevent complications.

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Original Article

Plasma Total Antioxidant Capacity in Bronchial Asthma and Possible Role of Antioxidant Supplementation for Asthma Treatment

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Abstract

Introduction: Bronchial asthma is a chronic inflammatory airway disease associated with strong oxidative stress. The lungs have antioxidant defenses to counteract the oxidative stress. The present study is attempted to assess the level of plasma TAC as a marker of antioxidant status and to evaluate if there is any correlation between this marker and pulmonary function tests in asthmatic patients. **Methods:** This cross-sectional comparative study was carried out in the department of Pharmacology & Therapeutics, Rajshahi Medical College, Rajshahi, Bangladesh from July 2018 to June 2019. 40 patients of bronchial asthma and 20 healthy controls were selected as samples. Pulmonary function tests were done and plasma TAC level was measured. **Results:** The mean plasma TAC found significantly lower in bronchial asthma patients compared to healthy controls ($p < 0.001$). The plasma TAC showed strong positive correlation with FEV1 & PEFR and moderate positive correlation with FEV1/FVC (%). **Conclusion:** As antioxidant status marker TAC significantly correlates with pulmonary function test values in asthmatic patients, this marker may be used to assess the prognosis of bronchial asthma. Augmentation of antioxidant defenses to restore the oxidant-antioxidant balance by antioxidant supplementation might be beneficial in the management of bronchial asthma.

Keywords: Bronchial asthma, oxidative stress, antioxidant, total antioxidant capacity (TAC), pulmonary function tests (PFTs).

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Introduction

In normal physiological condition, a balance is maintained between free radical generation and antioxidant protective defense system. When the balance is shifted towards excessive generation of free radicals, the condition is referred to as oxidative stress. In oxidative stress oxidant-antioxidant balance is shifted in favor of oxidants [1, 2].

Oxidant/antioxidant imbalance is responsible for various human diseases. Bronchial asthma is one of them. About 30 crore people in the world suffer from asthma [4, 5]. The disease cannot be cured, but proper management can

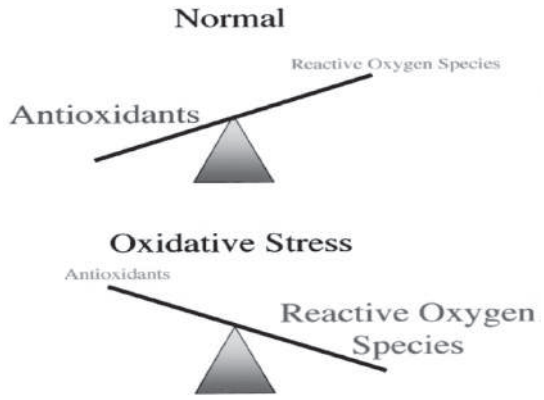

Figure 1. The oxidant-antioxidant balance in normal physiological condition and in oxidative stress [3].

control it. Oxidative stress plays an essential role in development and persistence of bronchial asthma [6, 7]. The lungs have antioxidant defenses to counteract the oxidative stress. Antioxidants can stabilize free radicals. They are the scavengers of free radicals and get easily oxidized. They donate their electron to free radicals for making them stable compounds [8, 9]. In oxidative stress endogenous antioxidants are used up, airway tissue injury initiated. Excessive oxidants production causes oxidant-antioxidant imbalance and asthma symptoms. So, antioxidants supplementation can help in restoring oxidant-antioxidant balance in asthmatic airways [6].

The total antioxidant capacity (TAC) is used to measure the overall antioxidant status of the body. The present study was attempted to assess the level of plasma total antioxidant capacity (TAC) in bronchial asthma patients and to evaluate if there is any correlation between this index and pulmonary function tests in asthmatic patients. If the association of plasma TAC with pulmonary function tests in asthmatics is explored, it would help better understand the pathogenesis of bronchial asthma. It might be a prognostic tool for the management of bronchial asthma. It would also help us in evaluating the role of antioxidant supplementation for the treatment of bronchial asthma.

Methodology

This cross-sectional comparative study was carried out in the department of Pharmacology & Therapeutics, Rajshahi Medical College (RMC) in collaboration with the Asthma Clinic and the outpatient department (OPD) of Rajshahi Medical College Hospital (RMCH), Rajshahi, Bangladesh from July 2018 to June 2019. Purposive sampling technique was employed to determine the required sample. 40 patients of bronchial asthma and 20 healthy controls were selected as samples.

Inclusion criteria:

1. Patients of bronchial asthma (Bronchial asthma was diagnosed by clinical history, relevant physical examination and a positive bronchodilator reversibility test showing an increase in FEV1 by more than 12% and at least more than 200 ml in comparison to baseline value).
2. Age group between 12 to 50 years.
3. Both genders were taken for study.

Exclusion criteria:

1. Subjects with chronic respiratory illness other than asthma like COPD, bronchiectasis, pulmonary tuberculosis etc.
2. Subjects having recent surgery, trauma.
3. Subjects having cardiovascular, thyroid, hepatic or renal diseases.
4. Subjects with altered antioxidant levels for reasons other than asthma such as sickle cell disease, diabetes mellitus, cancer.
5. Smokers, alcoholics.

Pulmonary function tests were done by a computerized spirometer (Spirobank-MIR). FEV1, FEV1/FVC (%) & PEFR was taken for study. Plasma TAC was measured by FRAP assay of Benzie and Strain, 1996 [10].

Permission & Ethical consideration

Prior to the commencement, the study was approved by the IRB of Rajshahi Medical College. Permission was also taken from Rajshahi Medical College Hospital authority. Permission from the Ethical Review Committee of Rajshahi Medical College was taken after informing thoroughly regarding study procedures & experiments. The aim and objectives of the study along with its procedures, risks and benefits were explained in easily understandable language to each participant and written consent was taken. They were assured that all information and records would be kept confidential and would be used only for study purposes.

Results

The study included 40 asthmatic patients and 20 normal healthy controls. Among the asthmatic patients 20 were newly diagnosed and 20 were bronchial asthma patients on treatment. The age distribution was from 15 to 50 years.

Discussion

Bronchial asthma is a chronic inflammatory airway disease. Oxidative stress is involved in asthma pathogenesis as well as exacerbation of the disease. Oxidant-antioxidant balance is required for the normal function of the lungs. Increment of antioxidant status is associated with improvement of pulmonary functions in asthmatic patients.

In the present study, out of 60 subjects, 20 were newly diagnosed bronchial asthma patients, 20 were bronchial asthma patients on treatment and 20 were healthy controls. In the study the mean plasma total antioxidant capacity (TAC) of newly diagnosed bronchial asthma patients, bronchial asthma patients on treatment and healthy control groups were 331.7 ± 36.3 µmol/L, 707.0 ± 67.6 µmol/L and 1037.5 ± 31.4 µmol/L respectively. The results revealed that the mean plasma TAC was significantly lower in bronchial asthma patients compared to healthy controls and was lowest in newly diagnosed group (table III). Similar findings were observed by Yadav & Saini (2016) [11] and Ahmad et al. (2012) [12]. They found significantly lower plasma TAC level in asthmatic patients compared to healthy controls. Al-Afaleg et al. (2011) [13] and Liao et al. (2004) [14] also reported significantly lower level of total antioxidant status (TAS) in asthmatic patients which are in agreement to our present study.

In our present study antioxidant status showed remarkable correlation with pulmonary function test values in asthmatic patients. The plasma TAC showed strong positive correlation with FEV1 & PEFR and moderate positive correlation with FEV1/FVC (%) (table IV, figure 2-4). These findings suggest that decreased antioxidant status was associated with worsening of pulmonary function in asthmatic patients. Similar findings were observed by Ahmad et al. (2012) [12], Yadav & Saini (2016) [11] and Nadeem et al. (2003) [15].

Ahmad et al. (2012) reported a positive association of plasma TAC level with FEV1 ($r = 0.42$, $p < 0.01$) in bronchial asthma patients which is in consistent with the present study [12]. Yadav & Saini (2016) found a positive correlation of plasma TAC level with FEV1 ($r = 0.227$, $p < 0.01$) in asthmatic patients which is in agreement to the present study [11]. Nadeem et al. (2003) revealed positive correlation of plasma TAC with FEV1 in asthmatics ($r = 0.47$, $p < 0.05$) which also supports the findings of our present study [15].

The findings of the present study have clinical implications. As antioxidant status significantly correlate with pulmonary function test values in asthmatic patients, this marker may be used to assess the prognosis of the disease. The inflammatory process in asthmatic airways causes oxidant-antioxidant imbalance and impairment of normal function of the lungs. So, augmentation of antioxidant defenses to restore the balance by means of therapeutic interventions might be beneficial in the management of bronchial asthma. Conventional treatment of asthma significantly reduces oxidative stress and elevates plasma TAC but not up to normal level. Therefore, the supplementation of antioxidants could be utilized to improve pulmonary function in asthmatic patients by boosting the endogenous antioxidants and restoring oxidant-antioxidant balance. Several previous studies were found in this regard.

Table I. Comparison of demographic characteristics (n=60).

Demographic characteristics	Group			*p* value
	Normal healthy controls (n = 20)	Newly diagnosed patients (n = 20)	Patients on treatment (n = 20)	
Age* (years)	34.3 ± 8.6	34.0 ± 11.0	33.8 ± 8.8	>0.05
Sex# Male	10 (50%)	10 (50%)	10 (50%)	>0.05
Female	10 (50%)	10 (50%)	10 (50%)	
BMI* (kg/m²)	24.9 ± 2.5	24.6 ± 2.9	24.9 ± 2.8	>0.05

*Data were presented as mean ± SD and test of significance done by ANOVA Test

#Figures in the parentheses indicate corresponding percentage and test of significance done by Chi-square Test

Table I shows the mean age of the study subjects was around 34 years & the mean BMI was around 24.8 kg/m². In each group the number of male and females were the same. There was no significant difference among the three groups.

Table II. Comparison of pulmonary function tests (n=60).

Pulmonary function tests	Group			*p* value
	Normal healthy controls (n = 20)	Newly diagnosed patients (n = 20)	Patients on treatment (n = 20)	
FEV_1 (L)	2.63 ± 0.64	1.35 ± 0.58	2.05 ± 0.63	<0.001ˢ
FEV_1/FVC (%)	88.7 ± 5.7	73.4 ±11.5	86.9 ± 4.8	<0.001ˢ
PEFR (L/sec)	6.31 ± 1.77	2.54 ± 1.19	4.12 ± 1.16	<0.001ˢ

s = significant

Data were presented as mean ± SD and test of significance done by ANOVA Test

Table II shows comparison of pulmonary function test values. The mean forced expiratory volume in 1st second (FEV1), mean FEV1/FVC (%) & mean peak expiratory flow rate (PEFR) were significantly lower in bronchial asthma patients compared to healthy controls ($p < 0.001$).

Table III. Comparison of plasma TAC of the study groups (n=60).

Variables	Group			*p* value
	Normal healthy controls (n = 20)	Newly diagnosed patients (n = 20)	Patients on treatment (n = 20)	
Plasma TAC (µmol/L)	1037.5 ± 31.4	331.7 ± 36.3	707.0 ± 67.6	<0.001ˢ

s = significant

Data were presented as mean ± SD and test of significance done by ANOVA Test

Table III shows the mean plasma total antioxidant capacity (TCA) was lower in bronchial asthma patients and was highest in the healthy control group ($p < 0.001$).

Table IV. Correlation of plasma TAC with pulmonary function tests (n=40).

Variables	Correlation coefficient (r)	*p* value
TAC with FEV1	0.846	<0.001
TAC with FEV_1/FVC (%)	0.558	<0.001
TAC with PEFR	0.875	<0.001

Data were analyzed using Pearson's correlation coefficient test.

Table IV shows strong positive correlation between plasma TAC & FEV1 (r = 0.846, p < 0.001) and between plasma TAC & PEFR (r = 0.875, p < 0.001), moderate positive correlation between plasma TAC &FEV1/FVC (%) (r = 0.558, p < 0.001) in patients of bronchial asthma.

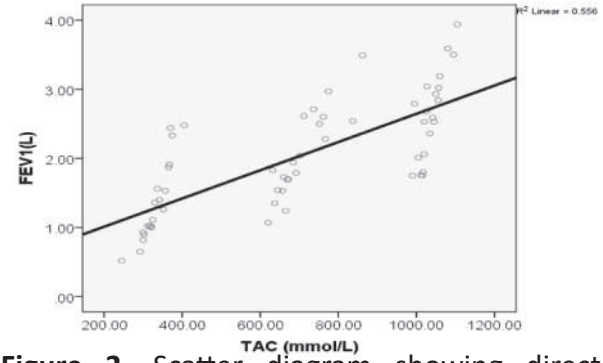

Figure 2. Scatter diagram showing direct correlation between TAC and FEV_1 in patients of bronchial asthma.

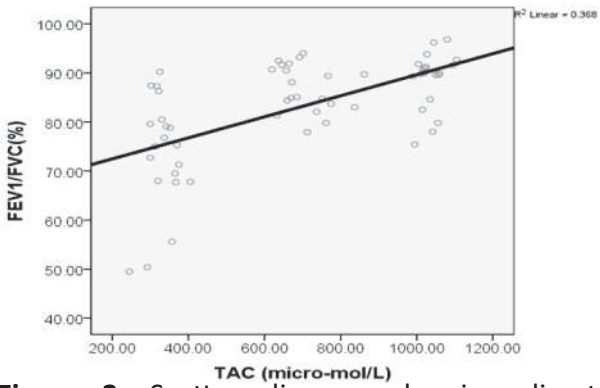

Figure 3. Scatter diagram showing direct correlation between plasma TAC and FEV_1/FVC (%) in patients of bronchial asthma.

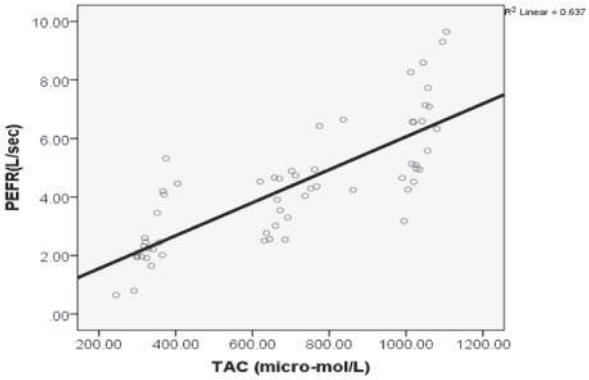

Figure 4. Scatter diagram showing direct correlation between plasma TAC and PEFR in patients of bronchial asthma.

Misso et al. (2005) observed that low dietary intake of vitamin C and carotene was associated with more severe asthma [16]. Tenero et al. (2016) reported that supplementation with zinc & selenium in asthmatic children was associated with reduced airway inflammation and improved pulmonary function [17]. Al-Jawad et al. (2010) noted that several antioxidants like vitamin E, vitamin C, zinc, selenium can reduce the symptoms of asthma and improve pulmonary function [18]. Wood et al. (2012) demonstrated the usefulness of increased fruits and vegetables intake in improving clinical outcome of asthma treatment [19]. Tecklenburg et al. (2007) found that supplementation of vitamin C reduced bronchoconstriction in asthmatic patients induced by exercise [20]. Budnevsky et al. (2017) showed that treatment with intravenous ceruloplasmin improved asthma control [5]. In these studies antioxidants were used as adjuvants along with conventional treatment. However, more studies are required, especially clinical trials to clarify the clinical value of antioxidant therapy in the management of bronchial asthma.

Conclusion

The findings of the present study have clinical implications. As plasma TAC significantly

correlates with pulmonary function test values in asthmatic patients, this marker may be used to assess the prognosis of the disease. The oxidative stress in the inflammatory process of asthmatic airways causes oxidant-antioxidant imbalance and impairment of normal function of the lungs. So, augmentation of antioxidant defenses to restore the balance by means of therapeutic interventions might be beneficial in the management of bronchial asthma.

Recommendations

Based on aforementioned data, we suggest that antioxidant therapy could be practiced in management of bronchial asthma along with conventional treatment. Early management through antioxidant supplementation would help to prevent exacerbation and clinical deterioration. However, further studies are needed before this supplementation could be officially recommended as an adjuvant therapy. The choice of antioxidant should also be evaluated in future clinical trials.

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Original Article

Parasites in Diarrhoeal Stool in under 5 Children in a Tertiary Care Hospital, Dhaka

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Abstract

Background: Infectious diarrhoea is a major public health problem in Bangladesh. Different bacteria, virus and parasites are responsible for diarrhoea in under 5 children. **Objectives:** To identify the parasites in diarrhoeal stools in under 5 children. **Methodology:** This was an observational cross sectional study carried out at Microbiology Department of Sir Salimullah Medical College, Dhaka. A total 217 diarrhoeal patients upto 5 years age, attending Pediatric unit of Sir Salimullah Medical College and Mitford Hospital, Dhaka and Dhaka Shishu Hospital, Dhaka during the period of July, 2015 to June, 2016, were enrolled in the study. Parasites were identified by wet mount preparation under microscope and Oocysts of Cryptosporidium were identified by Modified Ziehl- Neelsen staining. **Results:** Out of 217 diarrhoeal stools microscopic finding of diarrhoeal stools were detected by pus cells with or without RBCS in 90 (70.31%) samples, cysts of *Giardia intestinalis* were found in 9 (4.14%) samples, cysts of *Entamoeba histolytica* in 2 (0.9%) samples, eggs of *Trituris trichiura* in 2 (0.9%) samples and oocysts of *Cryptosporidium* were found in 5 (2.30%) samples. **Conclusion:** *Giardia intestinalis* was predominant parasite causing diarrhoea in under 5 children.

Keywords: Diarrhoea, Parasites.

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Introduction

Diarrhoeal diseases are second most common cause of morbidity and mortality in children in developing world [1]. The etiological agents of diarrhea are virus, bacteria and parasites. Aetiology of diarrhoea is variable according to geographic and climate conditions, host factors and socioeconomic situations. Among these parasites are important cause of diarrhoea in Bangladesh. *Giardia intestinalis, Entamoeba histolytica* and *Cryptosporidium* spp. are common diarrhoea causing parasites but they often show similar clinical presentations. Most of the patients complained of abdominal pain, diarrhoea and mild to moderate dehydration. The intestinal protozoan parasite *Giardia labmlia* (Syn. *Giardia intestinalis, Giardia duodenalis*) has recently emerged as an important cause of diarrhoea in humans [2]. In developing countries, about 200 million people have symptomatic giardiasis with some 500,000 new cases reported each year [3]. The disease is most common in areas where sanitation and hygiene are poor [4]. In Bangladesh several studies has been performed to determine the prevalence of *Giardia lamblia* by direct microscopic examination [5, 6].

The intestinal parasite *Cryptosporidium* spp. is an important cause of human diarrhoeal disease worldwide [7]. Infection with this para-

site is asymptomatic or mild and self-limiting inimmun-ocompetent hosts, but can be severe and chronic in immuno-compromised individuals or in severely malnourished children [8]. Drinking water plays an important role in transmission of infection. *Cryptosporidium* are a leading cause of diarrhea, particularly persistent diarrhea, in children in developing countries [9]. In Bangladesh, *Cryptosporidium* spp. are a significant cause of diarrheal disease in young children [10, 13]. In these areas of the world, *Cryptosporidium* spp. infection has been reported to be more common in malnourished children than in well-nourished children [14].

Diagnosis of giardiasis is best accomplished by detection of *Giardia* antigen by ELISA method in stool since the classic microscopic examination is less sensitive and specific [15]. Diagnosis of cryptosporidiosis is also best accomplished by detection of *Cryptosporidium* antigen in stool since the classic microscopic examination is less sensitive and modified acid-fast staining is required. But the antigen kits are expensive and not available at tertiary levels of Bangladesh. Recently multiplex real time PCR can be diagnosed these 2 to 3 important parasites in one reaction and species specific diagnosis is confirmed [15]. So in this study, four parasites has been detected in a laboratory facility of a tertiary care hospital.

Materials and Methods

The cross sectional study was performed on 217 stool samples of children of under 5 years of age with diarrhoea in outpatient and inpatient of Sir Salimullah Medical College, Dhaka and Dhaka Shishu Hospital, Dhaka. Stools were collected in a clean, dry, wide mouth and leak proof container. Before collection containers were labeled with full name, age, sex, serial number and time of collection.Then stool samples were carried in ice box to the Department of Microbiology of Sir Salimullah Medical College, Dhaka within 2 hours of collection. Cases were children upto 5 years of age passing watery or loose stools three or more times in 24 hours with/without mucus and or blood, vomiting, fever, abdominal pain. Stools were examined microscopically by wet film for detection of pus cells and parasites. Wet film was prepared directly from stool specimen as standard method in two preparations. Saline preparation demonstrate helminthes egg, larvae, protozoan trophozoites and cysts. It was also done for detection of pus cells and red blood cells. Iodine preparation also detect of cysts of parasites. Cysts of *Giardia intestinalis*, *Entamoeba histolytica* and eggs of *Trituris trichuri* were detected by saline and iodine preparation and oocysts of *Cryptosporidium* spp. was directly detected by saline preparation and about 2-3 drops of stool samples was spread on dry, sterile slide and then stain by modified Ziehl- Neelsen stain [16]. Then samples were plated on MacConkey agar media and incubated at 37°C for 24 hours in aerobic condition for isolation of enteric bacteria.

Results

Table-I shows microscopic finding of diarrhoeal stool samples. Of the 217 samples, findings were present in 58.99% (128) samples. Among these, pus cells with or without RBCs were present in 70.31% (90) samples, cysts of *Giardia intestinalis* in 7.03% (9) samples, cysts of *Entamoeba histolytica* and eggs of *Trituris trichuri* in 1.56% (2) and oocysts of *Cryptosporidium* were 3.91% (5).

Of the 217 stool samples bacteria were detected in 44.70% (97) stools and parasites were detected in 8.30% (18). The cysts of *Giardia* were 7.03% (9) in both saline and iodine preparation and oocysts of *Cryptosporidium* were 3.91% (5) in both saline and modified Ziehl-Neelsen stain. Others were cysts of *Entamoeba histolytica* and eggs of *Trituris trichuri* in 1.56% (2). The oocysts appeared red

to pink color in modified Ziehl-Neelsen stain. Among the under 5 years diarrhoeal child higher frequency of giardiasis and cryptosporidiosis were in 3-5 years of age. Among the 9 child of giardiasis 7 were between 3-5 years of age and 2 were between 2- 3 years of age. Among the 5 child of cryptosporidiosis 2 were between 3-5 years of age and 3 were between 2- 3 years of age.

Table I. Microscopic finding of diarrhoeal stools (n= 217).

Microscopic finding	Frequency n (%)
Finding present-	128 (58.99)
Wet film-	
Pus cells with/without RBCs	90 (70.31)
Cysts (*Giardia intestinalis*)	9 (7.03)
Cysts (*Entamoeba histolytica*)	2 (1.56)
Eggs (*Trituris trichuria*)	2 (1.56)
Modified Z-N stain-	
Oocysts (*Cryptosporidium* spp.)	5 (3.91)
Gram stain-	
Gram negative S-shaped bacilli	20 (15.63)
No findings	89 (41.01)
Total	**217 (100)**

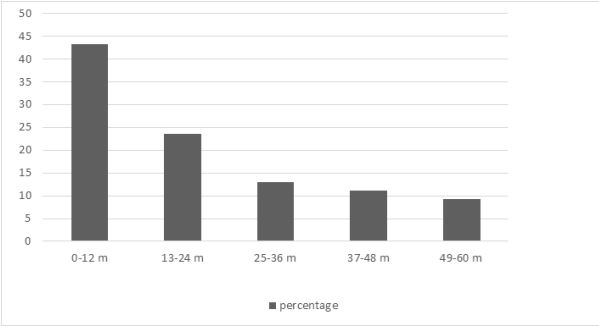

Figure 1: Age distribution of the diarrhoeal patients (n = 217).

Fig-1 shows distribution of diarrhoeal patients in different age groups. Among 217 patients 43.32% (94) were in 0-12 months; 23.5% (51) were in 13-24 months; 12.9% (28) were in 25-36 months; 11.06% (24) were in 37-48 months and 9.22% (20) were in 49-60 months of age.

Discussion

Giardia intestinalis and *Cryptosporidium* spp. are most common diarrhea causing parasites in developing world like Bangladesh [17]. In the present study cysts of *Giardia intestinalis* were detected in 7.03% stool by direct wet mount preparation. In Bangladesh several studies has been performed to determine the prevalence of *Giardia intestinalis* by direct microscopic examination [5, 6]. Haque et al., (2007) reported *G.intestinalis, Cryptosporidium spp* and *E. histolytica* in as a most common diarrhea causing parasites in Bangladesh [18]. Haque reported 11.3% and Suman reported 3.4% *Giardia* in diarrhoeal stool. The prevalence of *Giardia* infection was highest in children between 24 to 60 months of age in previous study [2]. The disease is most common in areas where sanitation and hygiene are poor [4].

The prevalence of *Cryptosporidium* spp. were 3.91% in this study by both direct wet preparation and modified Z-N stain. A prospective studies from ICDDR, B have reported *Cryptosporidium* spp. infection in 1.4−3.5% of individuals, and have identified this parasite as one of the major enteropathogens significantly associated with diarrhea in young children [14]. A recent study reported the presence of this parasite in 8.4% of diarrheal stool samples from Bangladeshi children. Among the two methods modified Z-N stain showed higher sensitivity and was able to detect oocysts easily as the oocysts stain red to pink against blue or green background and was able to detect even present a small number. Similar to this study cryptosporidiosis is prevalent in below 3 years of age [16, 17]. Earlier studies showed that oocysts can survive in chlorine treated water, but low prevalence in treated water and higher prevalence in wells water [19].

Conclusion

From the above study it could be concluded that, in Bangladesh *Giardia intestinalis* and *Cryptosporidium* spp. are important diarrhea causing parasites that can be easily and cost effectively detected in a laboratory facilities of primary, secondary and tertiary level hospital.

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Original Article

Comparison of Epidural Anesthesia versus Spinal Anesthesia in Elective Cesarean Section and Fetomaternal Outcome

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Abstract

Background: Epidural and spinal anesthesia are widely used for elective cesarean sections. Comparing their effects on maternal stability, anesthesia related complications, and neonatal health can clarify their respective benefits and risks. **Aims:** To compare the efficacy, safety, and fetomaternal outcomes of epidural anesthesia versus spinal anesthesia in elective cesarean section. **Methods:** This observational study was carried out in the department of Anesthesiology of Satkhira Medical College Hospital, Satkhira, Bangladesh during April 1, 2023 to March 31, 2024. It included 200 patients who had elective cesarean sections and were subdivided equally into two groups according to the appropriate clinical indications. *Group EA:* Received epidural anesthesia and *Group SA:* Received spinal anesthesia. Patient features, CS indication, decision-to-delivery interval (DDI), uterine incision-to delivery (UIDT), cord blood pH, APGAR scores and maternal and fetal morbidity have been noted. **Results:** The DDI and UIDT were not significantly different. One and 5-min APGAR scores were significantly ($p<0.05$) higher in SA group compared to EA group. The umbilical cord blood pH showed no difference. No differences were noted between both groups regarding post-operative neonatal and maternal morbidity. **Conclusion:** In elective Cesarean sections, comparing epidural and spinal anesthesia revealed comparable outcomes for fetal and maternal well-being. No significant differences were found in fetal gender, newborn birth weight, or neonatal asphyxia rates. Both techniques offer safe options, with spinal anesthesia showing advantages in APGAR scores and length of stay.

Keywords: elective cesarean section, epidural anesthesia, spinal anesthesia.

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Introduction

Cesarean section is the most frequent surgery performed in obstetrics as demand for comfort during labor rises and birth control restrictions are lifted, the prevalence of cesarean sections has increased significantly [1]. Elective cesarean sections pose risks including increased maternal infection, hemorrhage, and thromboembolism, along with anesthesia-related complications like hypotension. Neonates face risks such as respiratory distress and transient tachypnea. Future pregnancies may also be impacted, increasing the risk of uterine rupture and placenta previa [2, 3].

Lumbar epidural analgesia is considered the gold standard for labor pain relief and is recommended by the WHO, with usage rates ranging from 10% to 64% in high-income coun-

tries [4]. During labor, uterine contractions and cervical dilation activate nociceptive afferent fibers traveling to spinal nerves T10–L1, causing poorly localized visceral pain. As the fetal head descends, stretching the perineum and vagina, pain fibers via the pudendal nerve and spinal roots S2–4 are also activated [5]. Local anesthetics, opioids, and other adjuvants can be administered through an epidural catheter to modify these pathways and achieve analgesia. Despite widespread use, uncertainties remain about the optimal epidural regimen. Different drug combinations and concentrations administered epidurally have varying effects during labor and postpartum. With numerous variables in childbirth, distinguishing association from causation is challenging. Epidurals are associated with, but likely do not cause, prolonged labor and increased operative delivery risk [6]. These factors influence obstetric decisions. Epidurals are indicated for certain maternal conditions, such as pre-eclampsia or cardiac disease, which may be decompensated by labor. When epidurals are contraindicated (e.g., severe thrombocytopenia, coagulopathy, or sepsis), alternative analgesic regimes like patient-controlled remifentanil may be used.

Both epidural and spinal techniques provide regional blocks by administering local anesthetics near the spinal cord. These methods are preferred over general anesthesia due to lower perioperative and postoperative risks and their ability to facilitate rapid delivery in cases of fetal distress. Benefits include quicker recovery and less pain compared to general anesthesia, along with preventable systemic effects [7]. Variables to consider include perioperative events like anesthetic induction failure, hypotension, need for intraoperative analgesia, or conversion to general anesthesia after two failed attempts. Postoperative considerations include the neonate's Apgar score, maternal satisfaction, rate of post-dural puncture headache, postoperative pain, and infectious complications such as meningitis or encephalitis, and nerve injuries [8]. Studies indicate spinal anesthesia may result in shorter anesthetic times and less postoperative pain compared to epidural anesthesia. However, no definitive preference for one method over the other has been established. Continued research is needed to determine if one should be favored [8]. Therefore, this present study aimed to compare the efficacy, safety, and fetomaternal outcomes of epidural anesthesia versus spinal anesthesia in elective cesarean section.

Materials & Methods

This study received approval from the Ethical Review Committee of Satkhira Medical College (SMC), Satkhira. It was a prospective, randomized, non-blinded study involving 200 participants scheduled for elective cesarean sections (CS) with epidural analgesia (EA) and Spinal Anesthesia (SA). Conducted in the Department of Obstetrics and Gynecology and overseen by the Department of Anesthesiology at Satkhira Medical College Hospital, Satkhira, Bangladesh, the study ran from April 1, 2023, to March 31, 2024. Written informed consent was obtained from all participants, who were full-term, singleton pregnancies with an American Society of Anesthesiologists physical status of I or II. Each participant had fasted for at least 8 hours prior to surgery. The participants were randomly assigned to two groups: Group EA received epidural anesthesia and Group SA received spinal anesthesia.

The exclusion criteria for this study included malfunctioning epidural catheter or improper epidural placement, less than a 2-hour interval between the epidural analgesia top-up and the cesarean section, complicated pregnancies (such as multiple gestation, placenta previa, and pregnancy-induced hypertension), antepartum hemorrhage, cardiac disease, contrain-

dications to spinal anesthesia (SA), or risks associated with difficult airway or aspiration. These risks included maternal obesity with a body mass index of 30 kg/m² or higher, symptoms of gastroesophageal reflux, intestinal obstruction, ileus, elevated intracranial pressure, neuromuscular disease, mouth opening less than 4 cm, history of difficult intubation, or Mallampati classification Class III or IV [9]. The severity of labor pain was assessed using a numerical rating scale (NRS: 0-10). Malfunctioning epidural catheter or improper epidural placement was defined as unsatisfactory analgesia (NRS > 3, requiring more than two additional epidural boluses), manipulation or replacement of the epidural catheter, unilateral blockade, catheter occlusion, or catheter migration (intravascular or subarachnoid).

Intraoperative pain was assessed using 100-mm visual analogue scales (VAS). If a VAS score of 30 mm or higher was recorded, 100 µg of fentanyl was administered intravenously as a rescue analgesic. If pain persisted despite intravenous fentanyl administration, anesthesia quality was deemed inadequate, and GA was initiated. GA was induced via tracheal intubation with thiopental (5 mg/kg), suxamethonium (1.5 mg/kg), and labetalol (10 mg), and maintained with sevoflurane and N2O. Cases where GA was administered due to ineffective 100 µg fentanyl were classified as conversions to GA due to poor analgesia quality. Apgar scores at 1 and 5 minutes, as well as birth weight, were recorded post-delivery. Adverse effects such as nausea, vomiting, and shivering after anesthesia induction were monitored throughout the operation.

Results

A total of 200 patients were included in the study, with 100 allocated to the Epidural Anesthesia (EA) group and 100 to the Spinal Anesthesia (SA) group. More than half (57.0%) of the patients in the EA group and 63.0% (120 patients) in the SA group were aged 21-25 years. The mean age was 24.3±3.8 years for EA and 23.7±3.2 years for SA. The mean BMI was 26.3±3.2 kg/m² in EA and 26.7±3.6 kg/m² in SA. The majority of patients (80.0%) were classified as ASA I in the EA group and 79.0% (159 patients) in the SA group. More than three-quarters (77.0%) of the EA group and 81.0% (158 patients) of the SA group had a gestational age of 37-40 weeks (term). Nearly a quarter (23.0%) of the EA group and 19.0% (42 patients) of the SA group had postdated pregnancies. The differences between the two groups were not statistically significant ($p>0.05$). There were no significant differences between the groups regarding the indication for cesarean section, the duration of surgery, or the duration of anesthesia (Table I and II). Complications did not differ significantly ($p>0.05$) between the groups. However, the length of stay (LOS) was significantly shorter ($p<0.05$) in the SA group (Table IV). Baseline mean arterial pressure (MAP) and heart rate (HR) did not differ significantly between the groups. However, blood pressure (BP) was significantly lower in the SA group at 10 and 20 minutes, while HR was lower in the SA group but not significantly (Table IV). However, there were statistically significant differences ($p<0.05$) in APGAR scores at 1 and 5 minutes, with higher means in the SA group. Although the umbilical cord pH was higher in the SA group, this difference was not statistically significant (Table V).

Discussion

Caesarean delivery, a surgical procedure to deliver a baby, is often performed when vaginal delivery poses risks. Recent studies highlight increasing rates due to maternal request and medical indications [10]. Elective caesarean delivery, chosen without medical necessity, is rising due to factors like fear of labor pain and scheduling convenience. While it offers

Table I. Indication of cesarean section in both groups (n=200).

Indication	EA (n=100) n (%)	SA (n=100) n (%)	*p* value
Fetal bradycardia	28 (28)	37 (37)	0.174^{ns}
Meconium stained liquor	22 (22)	20 (20)	0.728^{ns}
Abruptio placenta	9 (9)	12 (12)	0.489^{ns}
Placenta Previa	6 (6)	8 (8)	0.579^{ns}
Preeclampsia/eclampsia	10 (10)	7 (7)	0.447^{ns}
Failed instrumental delivery	10 (10)	5 (5)	0.179^{ns}
Rupture uterus	2 (2)	5 (5)	0.248^{ns}
Cord prolapse	1 (1)	4 (4)	0.174^{ns}

ns=not significant; *p* value reached from chi square test.

Table II. Duration of surgery & anesthesia in both groups (n=200).

Duration	EA (n=100) Mean ± SD	SA (n=100) Mean ± SD	*p* value
Induction of anesthesia	8.1 ± 2.3	8.6 ± 2.5	0.143^{ns}
Duration of operation	60.2 ± 11.5	62.7 ± 12.7	0.164^{ns}

ns=not significant; *p* value reached from unpaired t-test

Table III. Comparison of heart rate, blood pressure, mean arterial pressure and their significance in epidural anesthesia and Spinal Anesthesia group (n=200).

	Parameters	EA (n=100) Mean ± SD	SA (n=100) Mean ± SD	*p* value
Preoperative	Heart rate (b/min)	80.5 ± 9.3	80.5 ± 9.3	1.000^{ns}
	SBP (mmHg)	123.4 ± 5.7	122.4 ± 4.3	0.163^{ns}
	DBP (mmHg)	79.5 ± 3.1	78.9 ± 4.5	0.273^{ns}
	MAP (mmHg)	92.9 ± 2.8	92.2 ± 2.9	0.084^{ns}
	SpO_2 (%)	99.3 ± 0.4	99.3 ± 0.3	1.000^{ns}
During Anesthesia	Heart rate (b/min)	65.9 ± 7.8	56.5 ± 9.5	0.001^{s}
	SBP (mmHg)	125.6 ± 8.0	135.9 ± 5.5	0.001^{s}
	DBP (mmHg)	76.8 ± 3.9	93.1 ± 9.2	0.001^{s}
	MAP (mmHg)	90.5 ± 4.9	106.8 ± 7.2	0.001^{s}
	SpO_2 (%)	100	100	1.000^{ns}
Postoperative	Heart rate (b/min)	65.9 ± 7.8	56.5 ±9.5	0.001^{s}
	SBP (mmHg)	120.9 ± 5.2	128.9 ±7.1	0.001^{s}
	DBP (mmHg)	71.9 ± 2.5	82.9 ± 3.1	0.001^{s}
	MAP (mmHg)	89.1 ± 2.5	98.9 ± 3.1	0.001^{s}
	SpO_2 (%)	99.2 ± 0.3	99.2 ± 0.3	1.000^{ns}

s=significant; ns=not significant; p value reached from unpaired t-test

Table IV. Distribution of the study patients by maternal outcome (n=200).

Maternal outcome	EA (n=100) n (%)	SA (n=100) n (%)	*p* value
Hypotension	38 (38)	69 (69)	[a]0.001[s]
Ephedrine	40 (40)	67 (67)	[a]0.001[s]
Tachycardia	1 (1)	3 (3)	[a]0.312[ns]
Hypertension	0 (0)	2 (2)	[a]0.155[ns]
Pulmonary edema	0 (0)	1 (1)	a0.316[ns]
Arrythmia	0 (0)	0 (0)	-
Hypoxia	0 (0)	0 (0)	-
Shivering	18 (18)	15 (15)	[a]0.568[ns]
Total anesthesia time	85 ± 10.41	77.1 ± 13.06	[b]0.001[s]

s= significant; ns= not significant;
a = *p* value reached from Chi-square test; b = *p* value reached from Unpaired t-test

Table V. Distribution of the study patients by fetal outcome (n=200).

Fetal outcome		EA (n=100) n (%)	SA (n=100) n (%)	*p* value
Fetal gender	Male	53 (53)	52 (52)	0.887[ns]
	Female	47 (47)	48 (48)	
Birth weight (gm)	≥2500	87 (82)	89 (89)	0.663[ns]
	<2500	13 (18)	11 (11)	
APGAR score at 1 min	0-6	11 (11)	7 (7)	0.323[ns]
	7-10	89 (89)	93 (93)	
APGAR score at 5 min	0-6	1 (1)	2 (2)	0.561[ns]
	7-10	99 (99)	98 (98)	
Asphyxia	Yes	30 (30)	27 (27)	0.638[ns]
	No	70 (70)	73 (73)	
Admitted to NICU	Yes	5 (5)	4 (4)	0.733[ns]
	No	95 (95)	96 (96)	

ns= not significant; *p* value reached from Chi-square test

predictability, it carries risks such as increased recovery time and potential respiratory issues for the newborn. It's crucial for patients to weigh these factors and consult healthcare providers [11].

Epidural and spinal anesthesia are common in elective caesarean sections. Epidural allows gradual drug administration, providing flexibility and longer postoperative pain relief [12]. Spinal anesthesia offers rapid onset and dense sensory blockade, making it suitable for quicker procedures. Studies indicate no significant difference in maternal satisfaction or neonatal outcomes, though spinal anesthesia is associated with lower maternal blood pressure [13].

In this study it was observed that there was no significant change in blood pressure before anesthesia in either group. During epidural anesthesia before delivery, systolic and diastolic blood pressures, as well as mean arterial pressure, dropped significantly but remained mostly stable in the postpartum period. In contrast, patients receiving epidural anesthesia experienced a substantial increase in mean arterial pressure and systolic and diastolic

blood pressures prior to delivery. In the study by Suguna and Karthikeyan, [14] there was minimal or no change in heart rate in patients receiving epidural anesthesia (EA) compared to those receiving spinal anesthesia (SA) ($p<0.001$). Additionally, patients in the EA group exhibited minimal fluctuations in systolic, diastolic blood pressure and mean arterial pressure ($p<0.001$) compared to the SA group. The difference in mean SpO_2 between the two groups was statistically insignificant. In elective cesarean sections, comparing epidural (EA) and spinal anesthesia (SA) shows significant differences in hemodynamic stability.

SA often causes bradycardia due to a rapid sympathetic block, whereas EA has a more gradual onset, leading to fewer severe drops in PR [15]. SA is associated with more frequent and severe hypotension compared to EA, which maintains more stable BP and MAP due to its slower onset of action [16]. Both techniques maintain adequate Oxygen Saturation (SpO2), though SA's greater risk of hypotension can affect tissue perfusion indirectly [17]. EA provides better hemodynamic control, reducing severe hypotension and bradycardia incidences, beneficial for maternal and fetal outcomes [18]. Spinal anesthesia is associated with a higher incidence of hypotension due to the more pronounced sympathetic block, leading to arterial and venous vasodilation [17]. Epidural anesthesia tends to have a more gradual onset, resulting in a less severe drop in blood pressure. To counteract hypotension, more frequent ephedrine boluses are required during spinal anesthesia compared to epidural anesthesia. This is due to the quicker and more severe onset of hypotension in spinal anesthesia [16]. Spinal anesthesia can lead to significant tachycardia and hypertension before delivery as the body compensates for the sudden hypotension [15]. Epidural anesthesia generally maintains more stable hemodynamic parameters throughout the procedure. Pulmonary edema and arrhythmias are rare but can occur more frequently with the rapid hemodynamic changes seen in spinal anesthesia. Epidural anesthesia's slower onset helps mitigate these risks. Hypoxia is more common in spinal anesthesia due to significant drops in blood pressure affecting oxygenation [18]. Shivering is also more prevalent due to the rapid temperature and blood pressure changes. Epidural anesthesia's gradual onset of action leads to more stable intraoperative and postoperative hemodynamic profiles, explaining its favorable outcomes in elective cesarean sections obtained by Tomulic Brusich et al [19]. In a study Suguna and Karthikeyan, [14] noted complications such as tachycardia, hypertension, hypotension, nausea, vomiting, and pulmonary edema. These complications were more frequent in the spinal anesthesia group compared to the epidural anesthesia group.

In the study by Hernandez Guzman and Alcantara, [20] the total anesthetic time was 85±10.41 minutes for the epidural anesthesia group and 77.1±13.06 minutes for the spinal anesthesia group. Hypotensive episodes occurred in 42.8% of patients in the epidural group versus 63.0% in the spinal group. Ephedrine administration was required in 42.8% of epidural patients and 61.5% of spinal patients. These findings suggest that spinal anesthesia is associated with a shorter total anesthetic time compared to epidural anesthesia. This is consistent with Okucu et al. [21] who found that spinal anesthesia generally offers faster induction and shorter total anesthetic times. Similarly, Huang et al. [8] reported that anesthesiologists often prefer spinal anesthesia for its quick onset despite the higher rate of hypotensive episodes, which necessitates more frequent use of ephedrine. This study in the spinal anesthesia group, 69.0% of patients experienced hypotensive episodes, defined as a systolic pressure decrease of over 20%, compared to 38.0% in the epidural group

(p<0.0001). Ephedrine use was higher in the spinal group (67.0%) versus the epidural group (40.0%) (p<0.001). These results align with the literature, indicating that spinal anesthesia, while quicker, is more likely to cause hemodynamic changes such as hypotension, even with prophylactic measures like uterine displacement and prehydration. Spinal anesthesia typically offers a faster onset of surgical anesthesia due to its direct administration into the cerebrospinal fluid, which results in a rapid and dense block. This characteristic makes spinal anesthesia advantageous in terms of quicker initiation and overall shorter anesthesia time. Conversely, epidural anesthesia requires more time for administration and onset, as it involves placement of a catheter in the epidural space, followed by incremental dosing to achieve the desired level of anesthesia. This process, although slower, allows for better control and titration of the anesthetic level, which can be particularly beneficial in managing hemodynamic stability and postoperative pain.

It was observed that fetal gender and newborn birth weight did not significantly differ between the epidural and spinal anesthesia groups. These findings align with those from other studies, such as those by Hernandez Guzman et al. [20], Yoon et al. [22], and Antonakou and Papoutsis [23], which similarly found no significant impact of anesthesia type on fetal gender and newborn birth weight. The statistical insignificance suggests that the choice between epidural and spinal anesthesia does not influence these specific neonatal outcomes. The lack of significant differences can be explained by the fact that fetal gender and birth weight are primarily determined by genetic and intrauterine factors, rather than by the type of anesthesia used during delivery. Maternal health, nutritional status, and genetic predispositions play a more critical role in these outcomes. The anesthesia technique, while important for maternal comfort and certain aspects of neonatal health, does not alter the fundamental determinants of fetal gender and birth weight.

In the Suguna and Karthikeyan [14] study, newborns underwent APGAR assessments at one and five minutes. Analysis revealed no notable differences among patient groups regarding the anaesthetic method employed. These findings align with previous studies by Hernandez Guzman et al. [20], Yoon et al. [22] and Antonakou and Papoutsis [23], which also found no correlation between neonatal outcomes and the use of epidural or spinal analgesia techniques. This consistency strengthens the conclusions drawn in the current investigation.

It was noted that neonatal asphyxia rates were 30.0% in the epidural anesthesia group and 27.0% in the spinal anesthesia group. However, no significant differences were found between the two groups regarding neonatal asphyxia rates. Those studies conducted by Hotoft & Maimburg [24], Cheng et al. [1], Yoon et al. [22], similar conclusions are drawn. These studies, like the present one, did not find significant variations in neonatal asphyxia rates between different anesthesia techniques during Cesarean sections. The incidence of neonatal asphyxia can be influenced by various factors, including the gestational age of the fetus, the presence of maternal health conditions, and intraoperative events during Cesarean section, such as placental abruption or umbilical cord complications. Additionally, differences in anesthesia management, such as the timing of administration and the use of adjunct medications, could also contribute to variations in neonatal outcomes.

In this study, it was found that 5.0% of neonates born under epidural anesthesia and 4.0% born under spinal anesthesia were admitted to the NICU. Similar trends were also observed by Novakovic et al. [25]. In the context of this study, several factors could

contribute to the incidence of NICU admission. This study population's demographics, the presence of comorbidities in either the mother or the baby, and the quality of postoperative care may all influence the need for NICU admission. Additionally, variations in anesthesia management, such as dosage and administration technique, could impact neonatal outcomes and subsequent NICU admission rates.

Limitations

This study was concerned only with elective Cesarean Section and emergency Cesarean Section was not considered. Differences in technique and practitioner expertise can introduce variability, making it challenging to attribute outcomes solely to the type of anesthesia. Inconsistent or subjective measurement and reporting of outcomes may lead to misleading conclusions about the efficacy and safety of each anesthesia type.

Conclusion

In the comparison of epidural versus spinal anesthesia for elective Cesarean sections, our study found no significant differences in fetal gender, newborn birth weight, or neonatal asphyxia rates between the groups. Both anesthesia techniques were similarly safe and effective, with comparable maternal and neonatal outcomes. However, the spinal anesthesia group showed higher APGAR scores at 1 and 5 minutes and a shorter length of stay. Baseline MAP and HR were similar, though BP was lower in the spinal group. These findings support the use of either technique based on clinical context and patient preference.

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Original Article

Evaluation of Fine Needle Aspiration Cytology (FNAC) of Lymph Nodes: A Single Institute Experience

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Abstract

Background: Fine needle aspiration cytology (FNAC) is a simple and rapid diagnostic tool for superficial lymphadenopathy although histopathological evaluation of lymph nodes is the gold standard diagnostic parameter. In this study, a cyto-histopathological correlation was done to evaluate the diagnostic accuracy of FNAC. **Objectives:** This study aimed to assess the usefulness of FNAC as a primary diagnostic tool in cases of lymphadenopathy based on histopathology. **Methods:** In this cross-sectional study, a cyto-histopathological correlation was done in 91 cases of superficial lymphadenopathy. Laboratory procedures including smear preparation, fixation, tissue processing, and staining were done according to the standard protocol followed by the National Institute of Laboratory Medicine and Referral Centre, Dhaka, Bangladesh. **Results:** Out of 91 cases, 39 were diagnosed as reactive lymphadenitis in FNAC, 37 of which were true positive and 2 were false positive which turned out to be non-Hodgkin lymphoma (NHL) on histological examination. All 37 cases (100%) of granulomatous lymphadenitis show cytohistological concordance. Out of the 10 cases of the lymphoproliferative disorder in which cytohistological correlation was done, six were of NHL, one of Hodgkin lymphoma (HL), and three of reactive lymphadenitis. In this study, the sensitivity, specificity, and diagnostic accuracy of FNAC of superficial lymph nodes were found to be 77.78%, 96.10%, and 94.50% respectively. **Conclusion:** FNAC is a relatively non-traumatic useful method of diagnosing both neoplastic and non-neoplastic lesions of lymph nodes.

Keywords: Fine needle aspiration cytology (FNAC), histopathology, superficial lymphadenopathy.

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Introduction

Fine needle aspiration cytology (FNAC) is a simple, less traumatic, and rapid diagnostic technique. Due to the early availability of results, simplicity, minimal trauma, and absence of complications, aspiration cytology is now considered a valuable primary diagnostic tool, especially for superficial lesions [1]. Lymphadenopathy is one of the commonest clinical presentations with etiologies varying from an inflammatory process to a malignant condition [2]. The early diagnosis of the cause underlying the enlarged lymph node enables the clinician to plan appropriate management [3]. Enlarged superficial lymph nodes are easily

amenable to evaluation by FNAC and hence FNAC is an important diagnostic technique in the armamentarium of the pathologist [4]. Although histopathological evaluation of surgically excised lymph nodes is a more specific and accurate diagnostic parameter, it is relatively more costly, time-consuming, and unsettling to the patient. FNAC is more cost-effective and relatively less traumatic. FNAC evaluation may prevent undergoing unnecessary surgery and permit the clinician to offer conservative therapy instead [3, 4].

The present study aimed to assess the different cytomorphological patterns associated with various lymphadenopathies and to evaluate the usefulness of FNAC as a primary diagnostic tool in cases of lymphadenopathy.

Methods

This cross-sectional study was conducted in the Department of Pathology, National Institute of Laboratory Medicine and Referral Centre, Dhaka, Bangladesh from January 2023 to July 2023. FNA was performed in 238 patients presenting with superficial lymphadenopathy referred from various health service centers all over the country. All the patients were carefully examined and relevant other investigations were evaluated properly, the procedure of FNAC was explained to each patient, and written consent was taken. Aspiration was done under aseptic precautions by a 26 gauge needle attached to a 10 cc disposable syringe. Smears were prepared on clean glass slides as per standard techniques, and fixed by immersing the slides in 95% ethanol and stained with Papanicolaou stain. One slide was kept for Ziehl-Neelsen stain if tubercular lymphadenitis was suspected. After staining, slides were mounted by standard coverslips and analyzed under Olympus CX43 double-head microscope. The stained smears were studied by two pathologists. The cytological findings were compared with histological findings, whenever possible. Subsequent histopathology was done in 91 cases. Surgical specimens were received in 10% neutral buffered formalin. The gross findings of the specimens were noted. Tissue processing, section preparations, and Hematoxylin & Eosin (H&E) staining were done according to the standard protocol maintained by the National Institute of Laboratory Medicine and Referral Centre (NILMRC). Histopathology was taken as a gold standard method of diagnosis. Based on histopathological findings sensitivity and specificity were calculated. True positives, were defined as those samples of malignancy (lymphoproliferative disorder favors lymphoma and metastatic carcinoma) diagnosed by cytology and confirmed on histopathology. True negatives were those that were negative for malignancy on both FNAC and histopathology. False positives were those cases that were diagnosed as a malignancy on FNAC but confirmed negative for lymphoma or metastatic carcinoma on histopathology. False negatives were those cases that were negative for lymphoma and metastatic carcinoma on FNAC but confirmed positive for malignancy on histopathology. Based on malignancy detection, sensitivity was defined using FNAC or biopsy (true positive/true positive +false negative). Specificity was defined based on benign lymphoid disease (reactive lymphadenitis and granulomatous lymphadenitis) detection (true negative /true negative +false positive). Diagnostic accuracy represents a combination of sensitivity and specificity [4-6]. Statistical analysis will be carried out by using Microsoft Excel, 2019.

Results

During this period, FNAC was performed in 238 patients with superficial lymphadenopathy. One hundred and forty-seven patients were males and 91, were female (M: F = 1.61:1). The age ranged from 7 to 76 years with a mean age of 39.2 years. The commonest site of lymph-

Table I. Cyto-histopathological correlation (n=91).

Cytological diagnoses	No. of cases	Histological diagnoses			
		Reactive lymphadenitis	Granulomatous lymphadenitis	Lymphoma (NHL & HL)	Metastatic carcinoma
Reactive lymphadenitis (reactive hyperplasia)	39	37 (TN)	-	2 (FN)	-
Granulomatous lymphadenitis	37	-	37 (TN)	-	-
Lymphoproliferative disorder favors lymphoma	10	3 (FP)	-	7 (TP)	-
Metastatic carcinoma	05	-	-	5	5 (TP)
Total	**91**	**40**	**37**	**9**	**5**

(TP= True positive, FP= False positive, TN= True negative, FN= False negative)

adenopathy was the cervical region constituting 207 cases. Among the remaining cases, seven were supraclavicular and 24 were inguinal lymph nodes. FNAC diagnoses were found to be as follows: reactive lymphadenitis (reactive hyperplasia) 166 (69.75%), granulomatous lymphadenitis (including tubercular lymphadenitis) 53 (22.27%), metastatic carcinoma 08 (3.36%), lymphoproliferative disorder favors lymphoma 11 (4.62%) (Figure 1). The criteria by which a diagnosis of reactive lymphadenitis was established included high cell density, lymphocytes at various stages of maturation, and a considerable number of tingible body histiocytes. The diagnosis of granulomatous lymphadenitis, favors tubercular lymphadenitis was based on the presence of epithelioid cell granuloma and necrosis with or without langhan giant cells. Out of eight cases of metastasis to lymph nodes, six cases (75%) were of metastatic squamous cell carcinoma and the remaining two (25%) cases were diagnosed as metastatic adenocarcinoma. Lymphoproliferative disorder favors lymphoma cases were a total of 11(4.62%) of which 10 were suspected as non-Hodgkin lymphoma (NHL) and one was Hodgkin lymphoma (HL). Non-Hodgkin lymphoma smears showed a monomorphous population of atypical lymphoid cells. Hodgkin lymphoma showed a

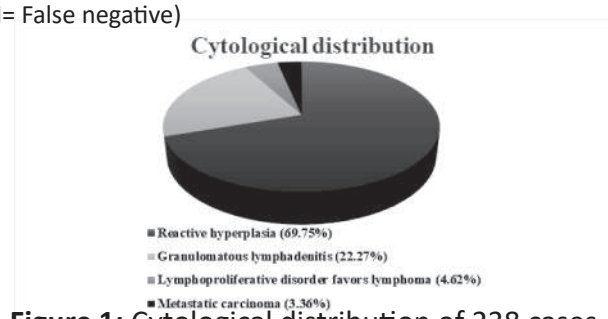

Figure 1: Cytological distribution of 238 cases.

mixed cell population including eosinophils & plasma cells with characteristic Reed-Sternberg giant cells.

A correlation was done in 91 cases that were surgically treated, and tissue was submitted for histopathological examination. Out of 91 cases, 39 were diagnosed as reactive lymphadenitis in FNAC, 37 of which were true positive and 2 were false positive which turned out to be NHL on histological examination. In 53 cytologically diagnosed cases of granulomatous lymphadenitis, histological corroboration was seen in 37 cases. All 37 cases (100%) of granulomatous lymphadenitis show cytohistological concordance. Out of the 10 cases of the lymphoproliferative disorder in which cytohistological correlation was done, six were of NHL, one of HL, and three of reactive lymphadenitis (Table 1). In this study, the sensitivity, specificity, and diagnostic accuracy of FNAC of superficial lymph nodes were found to be 77.78%, 96.10%, and 94.50% respectively.

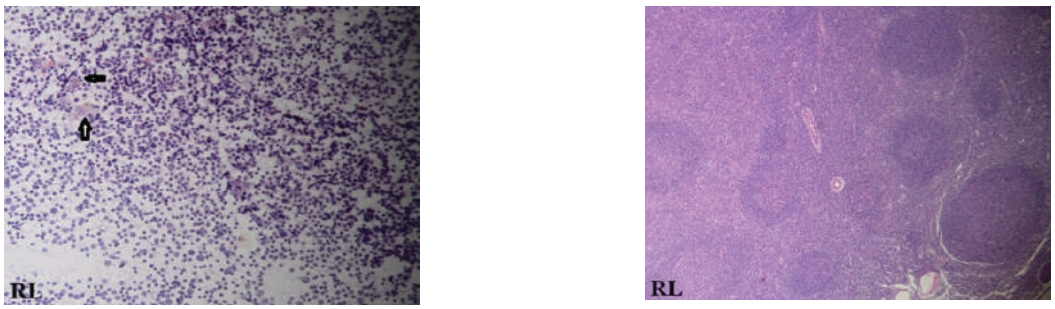

Figure 2: Photomicrograph of a case of reactive lymphadenitis (RL); Papanicolaou stain FNAC smear slide (left) 200x, black arrows indicates Tingible-body macrophages; H&E stain tissue section (right) 100x.

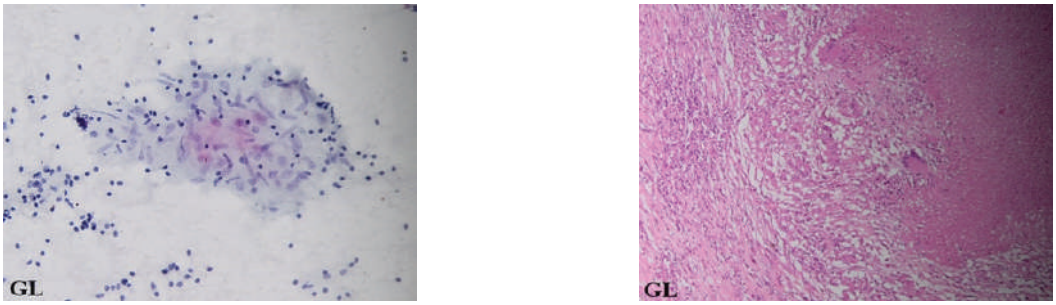

Figure 3: Photomicrograph of a case of granulomatous lymphadenitis (GL), consistent with tubercular lymphadenitis; Papanicolaou stain FNAC smear slide (left) 200x; H&E stain tissue section (right) 100x.

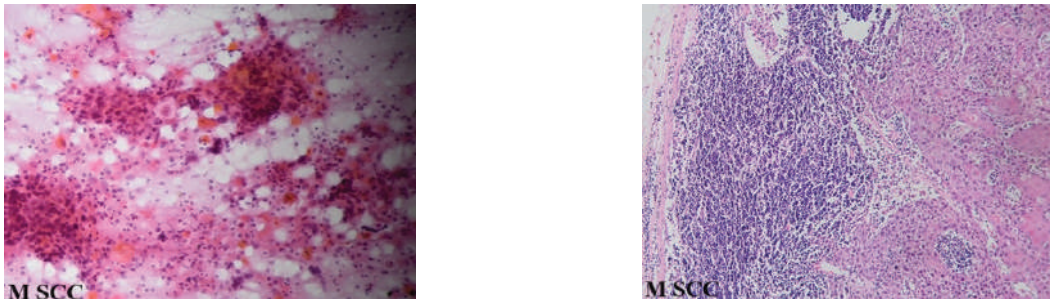

Figure 4: Photomicrograph of a case of metastatic squamous cell carcinoma (M SCC); Papanicolaou stain FNAC smear slide (left) 200x; H&E stain tissue section (right) 100x.

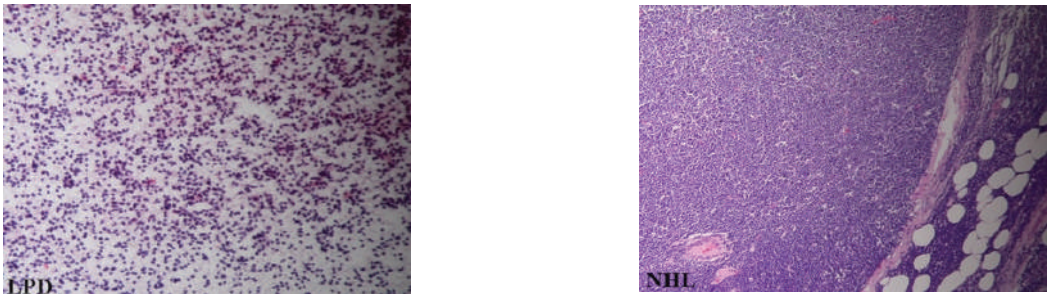

Figure 5: Photomicrograph of a case of Lymphoproliferative disorder favors lymphoma (LPD); Papanicolaou stain FNAC smear slide (left) 200x; H&E stain tissue section (right) 100x.

Discussion

FNAC is a simple, cost-effective diagnostic tool for establishing a diagnosis in cases of superficial lymphadenopathy [7]. This technique limits the need for unnecessary excisional biopsy of enlarged lymph nodes, especially in cases of reactive and tubercular lymphadenitis [8]. However grey areas still exist, especially in the case of primary lymphoproliferative disorders, where distinguishing low-grade non-Hodgkin lymphoma from reactive lymphadenitis may pose a diagnostic enigma even in experienced hands [9]. In this study, the male-to-female ratio was 1.61:1, with male preponderance, and age ranging from 7 to 76 years. As regards the site of FNAC, the cervical lymph node was the most common site of involvement. These figures come in close comparison to other studies [10, 11]. Out of 91 cases where the cytohistological correlation was done, 77 (84.61%) cases were benign (reactive lymphadenitis and granulomatous lymphadenitis) and 14 (15.38%) cases were malignant (lymphoma and metastatic carcinoma) lesions (Table 1). These findings were consistent with the results reported by some previous studies [12, 13]. In this study, the bulk of diseases are benign due to infections and tubercular lesions. In this study, reactive lymphadenitis was the most common diagnosis (Figure 2).

Similar results were noted in some recent studies, where tubercular lymphadenitis was the most common finding [15]. In this study, granulomatous lymphadenitis (including tubercular lymphadenitis) was the second most common diagnosis (Figure 3). The relative frequency of lymph node pathologies varies with the demographics of the study population. FNAC diagnosed lymphoproliferative disorders that favor lymphoma in only 11 out of 238 cases (4.62%) and formed a very small percentage of the total diagnoses, a finding that correlates with other studies [14, 15]. Metastatic deposits in the enlarged lymph nodes were diagnosed in 08 cases (3.36%) by FNAC.

Among the metastatic lesions, metastatic squamous cell carcinoma was the most common microscopic variant seen in both histo & cytopathology (Figure 4). A similar finding was reported by some other studies, showing a higher incidence of squamous cell carcinoma [16, 17]. In this study, 166 cases were diagnosed as reactive lymphadenitis on FNAC, of which histopathology was done in 39 cases.

Thirty-seven cases of reactive lymphadenitis diagnosed by FNAC were concordant with the corresponding histopathology. The remaining, two cases were diagnosed as NHL on histopathology. Lymphoproliferative disorder favors lymphoma was given in 11 cases, whereas cytohistological correlation was done in 10 cases. Seven cases of lymphoproliferative disorder favor lymphoma diagnosed by FNAC were concordant with the corresponding histopathology (six were of NHL and one of HL) (Figure 5). The remaining three were diagnosed as reactive lymphadenitis in histopathology.

Conclusion

FNAC is a convenient, relatively non-traumatic method of diagnosing the underlying pathology of superficial as well as deep-seated lesions. FNAC has proved to be an advantageous, economical, and useful tool in diagnosing both neoplastic and non-neoplastic lesions of lymph nodes, and become a convenient alternative to surgical biopsy of lymph nodes. It helps in surgical planning for malignant cases, where definitive surgical intervention can be performed in one session.

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Original Article

Study of Thyroid Profile and Prolactin Levels among Women Experiencing Infertility: A Tertiary Care Experience

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Abstract

Background: Infertility, the inability to conceive within a year, exists in primary (never conceived) and secondary forms (difficulty after a prior pregnancy). Thyroid hormones play a crucial role, with hyperthyroidism or hypothyroidism affecting menstrual cycles and fertility. Effective thyroid dysfunction management improves health and fertility. In regions like Bangladesh, where thyroid-related infertility is prevalent, screening is crucial. Hyperprolactinemia, linked to hypothyroidism, affects reproductive health. Globally, 8-12% of couples face infertility, with over 180 million affected in developing countries. Infertility rates in Bangladesh are estimated at 4% based on South Asian data. **Aim of the study:** This study aims to evaluate thyroid hormone status and level serum prolactin hormone in infertility. **Methods:** This prospective study, conducted in a Private Hospital, Satkhira, Bangladesh, involved 90 infertile women aged 20-40 years. The research spanned a year January 2022 to December 2022, and participants received detailed information and assured confidentiality. Inclusion criteria covered age, while exclusion criteria included factors like male infertility and certain female conditions. Written consent was obtained before interviews and blood tests for thyroid and prolactin levels. Hypothyroid patients were prescribed Thyroxine, and hyperprolactinemia cases received Cabergoline. A six-month follow-up assessed conception statuses. Statistical analysis using SPSS focused on completed follow-ups and presenting data through tables and graphs. **Results:** This study involved 90 participants, predominantly women aged 21-30 (58.89%). The mean age was 24.83 years. Body mass index (BMI) analysis showed 55% of females as overweight, 28.89% with a normal BMI, and 16.67% classified as obese. Menstrual history indicated that 45.56% had irregular menstruation, 44.44% had regular, and 10.00% experienced oligomenorrhea. Infertility duration varied, with 31.11% for 1-3 years, 51.11% for 4-6 years, and 17.78% for over six years. Infertility causes included tubal factors (28.89%), ovulatory issues (37.78%), endometriosis (6.67%), and 26.67% classified as unexplained. Thyroid status showed 90.00% euthyroid and 10.00% hypothyroid. Hyperprolactinemia was observed in 31.11% of participants. **Conclusion:** This study reveals notable rates of hypothyroidism and hyperprolactinemia, highlighting the importance of comprehensive screening. The research emphasizes links between thyroid dysfunction, menstrual irregularities, and prolonged infertility.

Keywords: Thyroid Profile, Prolactin Levels, and Infertility.

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Introduction

Infertility is characterized by a couple's inability to achieve conception within a specified timeframe, typically one year of regular unprotected intercourse [1]. This condition manifests in two forms: primary infertility, where couples have never experienced conception, and secondary infertility, marked by difficulty conceiving after a prior pregnancy, whether carried to term or ending in miscarriage [2]. The multifaceted causes of infertility often involve endocrine hormones, with thyroid hormones playing a pivotal role. Hyperthyroidism or hypothyroidism is associated with menstrual irregularities, anovulatory cycles, reduced fecundity, and heightened pregnancy-related morbidity [3, 4]. Effective management of thyroid dysfunction significantly improves health, restores menstrual regularity, and enhances fertility [5]. Given the prevalence of thyroid-related infertility in countries like Bangladesh, characterized by endemic goiter, it becomes imperative to screen for thyroid abnormalities in affected women [6, 7]. Additionally, prolactin, a hormone originating from the anterior pituitary lactotroph, is the primary trophic factor for breast milk synthesis [8]. Hyperprolactinemia, an excessive secretion of prolactin, is a common reproductive disorder [9], and its interrelation with hypothyroidism is noteworthy [2]. Prolonged primary hypothyroidism can lead to hyperprolactinemia, causing ovulatory dysfunctions ranging from inadequate corpus luteal progesterone secretion to oligomenorrhea or amenorrhea [10]. Amenorrhea in hypothyroidism results from hyperprolactinemia, attributed to a defect in the positive feedback of estrogen on LH, coupled with LH and FSH suppression [11]. Globally, infertility affects 8-12% of couples, with some regions reporting rates exceeding one-third [12, 13]. According to WHO, over 180 million couples in developing countries grapple with primary or secondary infertility [14]. Disparities in infertility care, socio-cultural values, and experiences of childlessness contribute to distinctions between the developed and developing worlds [15]. While the precise infertility rate in Bangladesh remains elusive, the World Infertility Survey suggests a prevalence of 4% based on South Asian countries and 15% considering women in the age range of 45-49 years after their reproductive lives [16, 17]. This study aims to evaluate thyroid hormone status and level of serum prolactin hormone in infertility.

Methodology & Materials

This prospective study was conducted in a Private Hospital, Satkhira, Bangladesh. The research included 90 women aged between 20 and 40 years, all of whom presented with infertility concerns at the obstetrics and gynaecological outpatient department for one year from January 2022 to December 2022. The participants were provided with detailed information about the study, and assurances were given regarding the strict confidentiality of their identities. Additionally, participants were given the choice to decline participation in the study. Written informed consent was obtained from each study participant before the interviews.

Inclusion criteria:

- Women between the age group of 20-40 years.

Exclusion criteria:

- Women below 20 years of age and above 40 years of age.
- Male factor infertility.
- Female factors like tubal factors cause endometriosis.
- Women with any congenital anomaly of the urogenital tract were excluded from the study.

Upon reviewing the predefined inclusion and exclusion criteria, explicit written consent was obtained from all participants involved in the study. The principal investigator then conduct-

ed individual interviews using a structured proforma to record the participants' responses. Subsequently, 2 ml of venous blood was drawn from each participant to analyze thyroid profile and prolactin levels. The findings from these investigations were documented in the same proforma. Based on these reports, patients exhibiting thyroid and prolactin disorders were initiated on appropriate treatments. Hypothyroid infertile females were prescribed Thyroxine (25-150 µg), such as Thyrox, Thyronorm, or Eltroxin, based on their TSH levels. For individuals with hyperprolactinemia, Cabergoline was administered. A follow-up was conducted after six months, during which the patients' conception statuses were evaluated.

Statistical Analysis

Statistical analysis focused solely on data from patients who had completed the six-month follow-up. All data were organized in tables or graphs based on relevance, with accompanying descriptions for clarity. The Statistical Package for the Social Sciences (SPSS) program on Windows was employed for all statistical analyses. Continuous parameters were presented as mean±SD, while categorical parameters were expressed as frequency and percentage. Group comparisons for continuous parameters were conducted using Student's t-test, while Chi-Square tests were applied for categorical parameters. A 95% confidence interval determined significance, and a P-value <0.05 was considered statistically significant.

Results

In this study, we included and examined a total of 90 participants. The age distribution of the study population is detailed in Table 1, revealing that 53(58.89%) women aged 21-30 years, 24.44% were below 20 years, and 16.67% fell within the 31-40 age range. The overall mean age of the study participants was 24.83 years, with a standard deviation of 5.65. Notably, 55% of the female participants were classified as overweight, 26 individuals (28.89%) had a normal BMI, and 15 individuals (16.67%) were classified as obese (Table 2). Table 3 provides insights into the menstrual history of the patients, indicating that 45.56% had a history of irregular menstruation, 44.44% maintained a regular menstruation pattern, and only nine individuals (10.00%) experienced oligomenorrhea. The mean menstrual period duration for the entire cohort was 5.6 days, with a standard deviation of 3.63. Participants reported an average marriage duration of 6.13 years, with a standard deviation of 4.96. Figure 1 visually represents the duration of infertility among the study participants, with 31.11% experiencing infertility for 1-3 years, 51.11% for 4-6 years, and 17.78% for more than six years. The causes of infertility are detailed in Table 4, revealing a diverse distribution of etiologies. Specifically, 28.89% of cases were attributed to tubal factors, 37.78% to ovulatory issues, and 6.67% to endometriosis. Additionally, 26.67% of cases remained classified as unexplained. The thyroid status of the study women showed that 90.00% were euthyroid, while the remaining 10.00% experienced hypothyroidism, with a mean±SD of 7.15±2.36 (see Table 5). Among the 90 women, 28 individuals (31.11%) exhibited hyperprolactinemia, while the remaining 62 individuals (68.89%) maintained normal prolactin levels. The mean prolactin level for the entire cohort was 51.86, with a standard deviation of 11.02 (Table 6).

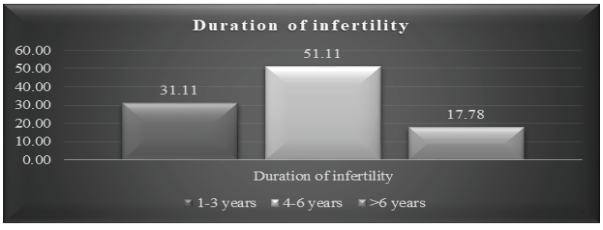

Figure 1: Duration of infertility of the study population (n=90).

Table I. Age distribution of the study population (n=90).

Age group (Year)	Frequency n (%)
<20	22 (24.44)
21-30	53 (58.89)
31-40	15 (16.67)
Total	90 (100)
Mean±SD	24.83±5.65

Table II. BMI distribution of the study population (n=90).

BMI	Frequency n (%)
Normal	26 (28.89)
Overweight	49 (54.44)
Obese	15 (16.67)
Total	90 (100)

Table III. Menstrual history of the study population (n=90).

Menstrual history	Frequency n (%)
Regular	40 (44.44)
Oligomenorrhea	9 (10)
Irregular	41 (45.56)
Variables	**Mean±SD**
Menstrual period (days)	5.6±3.63
Married for (years)	6.13±4.96

Table IV. Cause of infertility of the study population (n=90).

Causes of infertility	Frequency n (%)
Tubal factors	26 (28.89)
Ovulatory	34 (37.78)
Endometriosis	6 (6.67)
Unexplained	24 (26.67)
Total	90 (100)

Table V. TSH status of the study population (n=90).

Thyroid (TSH)	Frequency n (%)
Euthyroid	62 (68.89)
Hypothyroidism	28 (31.11)
Total	90 (100)
Mean±SD	7.15±2.36

Table VI. Prolactin status of the study population (n=90).

Prolactin	Frequency n (%)
Normal	62 (68.89)
Hyperprolactinemia	28 (31.11)
Total	90 (100)
Mean±SD	51.86±11.02

Discussion

This study was conducted to assess the imbalance in thyroid and prolactin hormones which usually presents as hypothyroidism, hyperthyroidism and hyperprolactinemia in infer time woman. In this present study, majority of 53 (58.89%) patients were aged under 21-30 years and the mean age was 24.83±5.65 years. Whereas Nambiar et al conducted a study before and decade and reported the mean age of the subjects were 25.19±4.17 years which are lower than the current study [18]. Among the study participant, 54.44% of them were found to be overweight and 16.67% were obese. Normal BMI was recorded among 28.89%. The relationship of thyroid function and BMI was described by Glinoer et al and Vermiglio et al. [4, 19]. Our study reports more than 45% of the women had irregular menstruation, 44.44% had regular menstruation and only 10% had oligomenorrhea (Table 3). The minimum percentage of menstrual abnormality presented by the infertile group was oligomenorrhea whereas Kumkum depicted the state to be smaller (50%). In the study done by Krasses et al, the prevalence of menstrual irregularities (mainly oligomenorrhea) reached 23% among hypothyroid patients and they reported significant association between the severity of menstrual abnormalities and higher serum TSH concentrations [20]. Goswami et al. reported irregular menstrual cycles, mainly amenorrhea, in 31% of the cases with hypothyroidism [8]. Regarding infertility, more than 50% of the study women suffered from infertil-

ity 4-6 years. In Trokoudes's study, they found the same duration [21]. A higher incidence of amenorrhea could be linked to hyperprolactinemia that was seen in the majority of patients with hypothyroidism. In this study, among 90 infertility participants the cause of infertility was ovulatory among 34 (37.78%) of them, tubal factors in 26 (28.89%) of the participants, unexplained cause among 24 (26.67%) participants and in 6 (6.67%) participants endometriosis is the cause for infertility. Among 90 participants, 81 (90.00%) were found to have normal thyroid levels, 9 (10.00%) participants were found to be hypothyroidism. A significant increase in serum TSH was found among infertile female patients. Majority of the infertile women had serum TSH within normal range, which is in concordance with study of Mili et al. [22]. In the study conducted by Hivre et al. study, the prevalence of hypothyroidism was reported as 17.5% among the infertile females whereas Sharma et al. found to be 20% [23, 24]. Sharma et al found the prevalence to be 20% [24]. The prevalence of thyroid dysfunction in infertile women was found to be 33.3% in a study by Rahman et al and 23% by Sharma et al [10, 24]. In this study, prolactin level was found to be normal in 68.89% of participants and hyperprolactinemia was noted in 31.11% of study participants. Hyperprolactinemia also adversely affects the fertility potential by impairing pulsatile secretion of GnRH and hence interfering with ovulation [25]. In this study, though majority of the infertile women had serum prolactin within normal range, which is concordance with study done by Sharma et al, there was a significant increase in serum prolactin (hyperprolactinemia) of infertile female patients (31%) [25].

Limitations of the study

While this study provides valuable insights into the thyroid and prolactin profiles of women experiencing infertility, several limitations should be acknowledged:

1. The study's cross-sectional design limits the ability to establish causation, as associations observed may not imply a direct cause-and-effect relationship.
2. The study's sample size of 90 participants from a single tertiary care center may only partially represent the diverse population of women experiencing infertility in Bangladesh. The exclusion of women with certain conditions, such as congenital urogenital anomalies, may introduce selection bias.
3. The study's reliance on self-reported menstrual histories and infertility durations could be subject to recall.

Conclusion & Recommendations

This study provides valuable insights into the thyroid profile and prolactin levels among women experiencing infertility in a tertiary care setting in Bangladesh. The prevalence of hypothyroidism and hyperprolactinemia was notable, emphasizing the need for comprehensive screening and management strategies. The study underscores the association between thyroid dysfunction, menstrual irregularities, and prolonged infertility durations. Addressing thyroid abnormalities through appropriate interventions, such as thyroxine supplementation, and managing hyperprolactinemia with medications like Cabergoline can significantly improve fertility outcomes. These findings contribute to the understanding of endocrine factors influencing infertility, informing targeted interventions to enhance reproductive health in affected populations. Further research is warranted to explore the broader implications of thyroid and prolactin imbalances on fertility outcomes and to develop more tailored treatment approaches.

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