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Contribution of Medical Biochemistry to Medicine

Md. Abdur Rahim[1]

Medical biochemistry is biochemistry related to human health and disease. Its applicative arm is clinical chemistry, a field that focuses on the methodology and interpretation of chemical tests performed to support diagnosis and treatment.

1. What Is Medical Biochemistry?

Chemistry is a science of matter. Biochemistry focuses on the studies of biological matter. Previously, biochemistry was referred to as 'biological chemistry' or 'physiological chemistry' (a term that is still occasionally used for the sake of tradition). In France the term 'biochemie medicale' is used as an equivalent of physiological chemistry. Similarly, in some Polish universities, departments of physiological biochemistry were named 'medical biochemistry' (biochemia lekarska). Molecular biology is commonly regarded as part of biochemistry and this is reflected in the names of a number of scientific societies and journals.

Medical biochemistry will be regarded as biochemistry (and molecular biology) applied to human organism in health and disease. Medical biochemistry seeks to advance the understanding of chemical structures and processes that constitute health and disease, and underlie transformations between these two states.

Clinical biochemistry is an important applied sub-discipline of medical biochemistry, also known under the names of clinical chemistry, pathological biochemistry or chemical pathology. Clinical biochemistry is concerned with methodology and interpretation of biochemical tests performed on body fluids and tissues, to support diagnosis, treatment and monitoring of disease.

2. The Scope of Medical Biochemistry

The scope of medical biochemistry, which follows, has been a basis for medical teaching in the discipline, and encompasses most of its current clinical applications. Thus, the typical scope of medical biochemistry includes the following:

✓ **The Chemistry of Structures Comprising Human Organism:**

The chemical components of the human body: aminoacids and proteins, simple carbohydrates and lipids. Complex carbohydrates and complex lipids. Components of the extracellular matrix. Components of blood and plasma. Biological membranes.

✓ **Key Chemical Processes in the Human Body:**

The nature of enzymes. Membrane transport mechanisms. Membrane receptors and signal transduction. Oxygen transport. Blood coagulation. The immune response and biochemical mechanisms of hormone action. Structure and function of neurotransmitters. Cellular homoeostasis, growth, differentiation and cancer. The process of ageing.

✓ **Nutrition and Metabolism**:

Assimilation of nutrients, the function of the gastrointestinal tract, and processes of intestinal absorption. Macro and micronutrients: vitamins and minerals. Bioenergetics and oxidative metabolism. Mitochondrial respiratory chain. Main metabolic pathways: glycolysis, storage and synthesis of carbohydrates, the tricarboxylic acid cycle (Krebs cycle), oxidative metabolism of lipids, and biosynthesis and storage of fatty acids. Biosynthesis of cholesterol and steroids. Lipoproteins and lipid transport. Biosynthesis and degradation of aminoacids. Oxidations and the role of free radicals

✓ **Integrative Aspects of Metabolism:**

Glucose homoeostasis and the metabolism of body fuels. Calcium and bone metabolism. Nutrition and energy balance. The metabolic role of the liver. Muscle metabolism (its energy metabolism and mechanism of contraction). Water and electrolyte homoeostasis and kidney function. The acid-base balance. Note that, historically, the last two topics had been relatively superficially treated in textbooks of biochemistry in spite of their practical relevance.

✓ **Elements of Molecular Biology:**

Nucleic acids and molecular genetics. DNA, RNA and protein synthesis. Regulation of gene expression. Recombinant DNA technology. Genomics, proteomics and metabolomics.

1. Professor & Head, Department of Biochemistry, Rangpur Community Medical College

3. The Changing Scope of Clinical Biochemistry

Clinical biochemistry is driven by the discovery of biomarkers, and the availability of appropriate measurement methods. Therefore, its scope constantly changes. It became an autonomous discipline in the 1940s.

As a discipline, clinical biochemistry includes two main components: methodological and interpretative. The early textbooks were strongly focused on methodology, whereas the majority of contemporary ones emphasize interpretative aspects and clinical correlations, reflecting close professional relationship between clinical chemists and practicing clinicians.

Between the 1950s and 1980s, the focus of clinical biochemistry was on the development of methodologies appropriate for measurement of various analytes in a large number of patient samples, the ways of obtaining biological material, the establishment of normal ranges (reference values), and the principles of quality control in clinical laboratories. Introduction of automated equipment began in the late 1950s. At that time the range of the offered diagnostic tests included glucose, non-protein nitrogen to assess the renal function, amino-acid nitrogen to gauge the nutritional status, plasma and urinary proteins, lipids, enzymes, electrolytes (including calcium, magnesium and phosphorus), and parameters of acid base balance. Trace metals such as copper and zinc, as well as vitamins, were measured as part of nutritional assessment, and hemoglobin, porphyrins, and iron in the diagnosis of hematological disorders. The measurements of drugs and poisons were being actively developed. Importantly, for practical purposes, tests within this spectrum were grouped into the 'test profiles' that reflect the function of a specific organ (or a particular - tissue, such as muscle). Organ and tissue profiles were established for liver, pancreas, bone, muscle, heart and kidney. The early profiles had been mostly based on the pattern of organ-specific enzyme activities. In addition to blood, urine (including urinary calculi), feces, cerebrospinal fluid and other body fluids were examined. Endocrinology-related testing included thyroid function tests, steroid hormones, hormones of hypothalamo-pituitary-adrenal axis, estrogens and progestogens (including assessment of the gonadal, feto-placental function, and pregnancy), and epinephrine, norepinephrine and related compounds. Before the introduction of radioimmunoassay, which allowed measurement of picogram concentrations of hormones, hormones were measured indirectly (e.g. thyroid hormones were estimated as protein-bound iodine, and steroids, rather crudely, as their urinary metabolites).

A range of 'dynamic' function tests was developed, where a substance (such as, for instance, glucose) is administered first and the response of its plasma concentration monitored for a period of time.

By the late 1970s clinical biochemistry accumulated large interpretative knowledge, reflected in the content of the clinical biochemistry textbooks published at the time. There was an increasing understanding of the concept of biological variability (which is one of the most important contributions of clinical biochemistry to medicine). The investigation of inborn errors of metabolism expanded, and toxicology and drug monitoring became an important part of the clinical laboratory repertoire.

Endocrinology became overwhelmingly based on radioimmunoassay and related methods, and similar methodology was being used for tumor marker measurements. Endocrinology and endocrine function tests were fast becoming a major part of clinical biochemistry. Tumor markers and therapeutic drug monitoring became fast-growing areas. The measurement of an increasing number of plasma proteins also remained within the core of clinical chemistry.

Large amount of knowledge generated by clinical biochemistry was now being accepted into clinical practice across medical and surgical disciplines. The practically most important areas were the assessment of water and electrolyte metabolism and hydrogen ion homeostasis, which lead to diagnosis and treatment of an entire range of 'new' clinical disorders. Particularly important was the contribution of clinical chemistry to the diagnosis and monitoring of diabetes (with the introduction of glycated hemoglobin as a measure of time-averaged glycemic control) and the progress in understanding and treatment of diabetic coma (ketoacidosis). The importance of lipids and lipoproteins for public health increased enormously after the results of clinical studies showing the benefit of lipid lowering for cardiovascular risk had been published. Finally, clinical chemistry became important contributor to the development and monitoring of intravenous nutrition. An important methodological development was also the point-of-care testing: development of a range of portable or small desktop analyzers and dry-reagent test strips, which allowed low-volume emergency testing on the hospital wards, or indeed self-testing by patients.

A particularly well-structured textbook of clinical biochemistry has been the Tietz Textbook of Clinical Chemistry where the editors successfully combined the methodological and pathophysiological aspects of clinical chemistry. It was originally edited by N. Tietz, and from 1986 by C.A. Burtis and E.R. Ashwood. In its last (6th) edition, it changed the title to Clinical Biochemistry and Molecular Diagnostics (and acquired a third editor, D. Bruns), reflecting the fact that clinical biochemistry

similarly to general biochemistry, embraced molecular biology.

More recent methodological issues in clinical biochemistry are all associated with high-volume testing: laboratory automation and workflow management, and computational issues. In parallel to expansion of evidence–based medicine, clinical biochemists started to examine systematically the existing evidence for the benefit of diagnostic tests, under the banner of evidence-based clinical biochemistry. There is also fast expansion of molecular diagnostics (in particular the diagnosis of hematological neoplasms), and pharmacogenetics. In recent years, substantial progress has been achieved in genetic screening.

Thus, with an expanding test range, the scope of clinical biochemistry increasingly matches the entirety of 'basic' medical biochemistry. As we have seen above, medical biochemistry also includes elements of immunology and hematology. For historical reasons, in some countries a sort of tribal approach to laboratory medicine persists, and separate clinical laboratories of hematology and immunology exist in addition to clinical biochemistry.

Paediatric clinical biochemistry is an increasingly specialized field, characterized not only by often-different reference values but also by emphasis on diagnosis of inborn errors of metabolism.

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Outcome of Breech Deliveries Between the Primiparous and Multiparous Women - Two Years Experience in a Tertiary Care Hospital

***Basak MR[1], Sultana F[2]**

Background: Breech is the commonest mal-presentation where increased perinatal and maternal mortality and morbidity are reported compared to cephalic presentation. This unwanted outcome can only be prevented by planned delivery methods.

Objective:The objective of the study was to evaluate both the maternal and fetal outcome of breech delivery of both primiparous and multiparous women admitted in a tertiary care hospital.

Methods: This prospective observational study was done at the Department of Obstetrics & Gynecology of Rangpur Medical College. Appropriate cases of breech presentation were included and all necessary information was noted including predictive factors, management details and outcome of the delivery.

Results:During the study period, total 1621 neonates were delivered. Among them 104 (6.41%) were in breech presentation. Among those cases, vaginal deliveries were 10 out of 53 patients (18.9%) in primiparas compared with 18 out of 51 (35.3%) in multiparas mothers. Successful vaginal deliveries were observed high (45%) in multiparous mothers. Regarding the fetal outcome, 28.3% (15/53) neonates delivered with complications in primiparous compared with 19.6% (10/51) in multiparous women. There was no difference in the rates of fetal birth asphyxia between neonates of primiparous and the neonates of multiparous (46.68% vs50.0%, respectively; p=0.162). But birth traumas were significantly more frequent in the primiparous compared with multiparous (40.0% versus 30.0%, p=0.023). Higher percentage (43.4%) of neonates needed admission in primiparas group compared with 33.3% in multiparas; that is 69 statistically significant (p=.012). Majority of the neonates admitted in neonatal ward due to birth asphyxia in both of the groups (39.1% in primiparas versus 41.1% in multiparas mothers).

Conclusion:Higher percentage of multiparas women suffered from different morbidities compared to primiparas that is statistically significant as a whole ($p < 0.05$). Maternal complications in puerperium were higher in multiparas compared to primiparas that is statistically significant ($p < 0.05$). Proper planning of delivery methods is important to decrease both the maternal and fetal morbidities and mortality irrespective of parity.

Key words: Breech, Primiparous and Multiparous.

Introduction:

Vertex is the usual presentation at the time of parturition. Breech is the commonest mal-presentation which is defined as the initial entrance of the gluteal region, rather than cephalic region, of the fetus into maternal pelvis. The incidence of breech presentation is 25% before week 28, 7% at week 32 and 3-4% at 38-40 weeks of gestation.[1-3] In pregnancies complicated by breech presentation, perinatal mortality, neonatal mortality or serious neonatal morbidity are increased as compared to pregnancies where the fetes is in cephalic position.[2,3,4]

This is a usual practice in Bangladesh to do the caesarean section to deliver the baby in breech presentation, although vaginal breech delivery is not an uncommon practice. Over the last three decade, it has been realized that breech presentation may well be a bad prognostic factor. It is thought that there is a higher peri-natal & maternal mortality and morbidity with breech presentation than for the fetus in a cephalic presentation.[5,6] In one study, it shows that irrespective of gestational age and low birth weight, the peri-natal mortality was higher in breech groups than in the vertex group.[7] But, every parent has a high expectation for the best outcome of pregnancy-a healthy baby and mother. Later, it is realized that the peri-natal morbidity and mortality can be reduced by planned delivery methods.[3,8] Here, parity is an important factor in considering delivery methods in breech presentation to have a better fetal

1. Associate Professor, Dept. of Paediatric Rangpur Community Medical College
2. Profesor, Dept. of Gynae & Obs. Rangpur Medical College & Hospital

**** For Correspondence***

outcome. It was observed in a study that successful vaginal deliveries were conducted 50% in nulliparous compared to 75.8% in multiparous women where neonatal complications were more in nulliparous.[9] It was observed improved fetal outcomes in breech presentation only with planned
caesarean section in different studies irrespective of parity.[3,10-12] As a result, majority of the breech pregnancies underwent cesarean sections[3,11,] although the overall rate of caesarean section in Asia was [27].3%.13 But maternal morbidity was somewhat increased with caesarean section.[2,14] Elective cesarean section does not guarantee the improved outcome of the child but may increase risks for the mother including hemorrhage infection and prolonged hospital stay, compared to vaginal breech delivery.[8] In addition, caesarean deliveries need a lot of resources that may not be feasible in all settings in a poor country like Bangladesh. However, it is the time to think that not all breech presentation require caesarean delivery. So, parity, mode of delivery, resources and outcomes should be in consideration in planning breech delivery.

Meterials and methods

Study design:

The study is descriptive longitudinal in nature with some analytical components.

Period and place of study:

The study was carried out in in-patient section of the department of Gynecology & Obstetrics, Rangpur Medical College, Rangpur and neonatal unit, department of Pediatrics, Rangpur Medical College Hospital, Rangpur during the period of January 2015 – December 2017.

Study population:

In this present study, total 104 cases were taken.

Inclusion criteria:

i) Breech presentation from 37 to 42 weeks of gestation.

Exclusion criteria:

i) Multiple pregnancies
ii) Intra-uterine death (IUD)
iii) Severe PE, eclampsia
iv) Systemic disease, i.e, SLE
v) Uncontrolled diabetes mellitus

Ethical consideration:

Written informed consent was taken from every study participant. None of the names were used in the data bases. Participants were able to withdraw themselves from the study at any time they desire. The study was carried out after approval of the ethical committee.

Methods and data collection:

After taking written consent, history was taken (age,weight, height,gravid,ante-natal check up) and breech presentation was confirmed by clinical examination and/or ultasonongraphic findings among the admitted patients of obstetrics indoor department. After delivery, maternal complications like amount of bleeding after delivery, post-partum hemorrhage, shock, retained placenta, genital tract injury, sepsis, anesthetic complications, fever, urinary tract infections, wound infections, assisted delivery, maternal mortality and fetal details such as gestational age, sex, birth weight,apgar score and fetal complications like birth asphyxia, low birth weight, APGAR score, birth trauma, neonatal death,till birth,live birth without complications were recorded. Only term singleton breech pregnancies without other obstetric complications or medical diseases were selected for data collection. After collection of data, master sheet was prepared for analysis.

Statistical analysis:

The collected data was compiled and findings were presented in the form of tables and graphs. Appropriate statistical analysis of the data was done using statistical package for social science (SPSS) with student *t*-test, chi-square test and others where applicable.

Results:

During the study period, total 1621 babies were delivered. Among them 104 (6.41%)were in breech presentation and the rest 1517 (93.59%) were other presentations. Vaginal deliveries were 10 out of 53 patients (18.9%) in primiparas compared with 18 out of 51 (35.3%) in multiparas mothers. successful vaginal deliveries were observed high (45%) in multiparous mothers.

79.2% mothers in primiparous group had ante-natal care before delivery, while only 74.5% had ante-natal care in multiparous group that was not statistically significant. Rest of them had either no or poor ante-natal care. Mean height in primiparous and multiparous group was 150.3±3.8 cm and 152.2±4.7 cm respectively that was not statistically significant. Mean weight in primiparous and multiparous group was 66.3±5.5 kg and 67.2±5.7 kg respectively that was not statistically significant.

Table-I: Demographic characteristics and immediate fetal outcome by parity

	Primiparous women (Mean±SD)	**Multiparous women (Mean±SD)**
Maternal age (y)	24.58±5.16	28.9± 6.14
Birth weight (gm)	3134.67± 344.51	3246.87± 433.23
5-min APGAR score	8.1± 1.0	8.3± 1.3

The table demonstrates the variation of maternal age in years, birth weight in grams and 5-minutes APGAR score according to parity.
86.8% of primiparas and 72.5% in multiparas did not suffer from any maternal complications during delivery. No mortality was reported. Higher percentage of multiparas women suffered from different morbidities compared to primiparas that is statistically significant as a whole (p <0.05) shown in table-2

Table-2: Comparison of maternal complications during delivery in both the groups

Maternal Complication at delivery	Primiparas mothers (n=53)		Multiparas mothers (n=5)		p-value
	Number	Percentage	Number	Percentage	
None	46	86.8	37	72.5	<0.05
MaternalDeath	00	00	00	00	
PPH	02	3.7	05	9.7	
Retained placenta	01	1.9	01	1.9	
Genital tract injury	03	5.7	04	7.8	
Anaesthetic complications	01	1.9	03	5.8	
Shock	00	00	01	1.9	

Maternal complications (shown in table-3) in puerperium were higher in multiparas compared to primiparas that is statistically significant (p <0.05). Fever was the commonest complication in both the groups.

Table-3: Relation between mode of delivery and maternal complications during puerperium

Maternal Complication during puerperium	Primiparas mothers (n=53)		Multiparas mothers (n=51)		p-value
	Number		Number	Percentage	
None	32		19	37.4	<0.05
Secondary PPH	03		05	9.8	
Fever	09		11	21.6	
UTI	03		08	15.6	
Wound infection	06		08	15.6	

Regarding the fetal outcome, 28.3% (15/53) neonates delivered with complications in primiparous compared with 19.6% (10/51) in multiparous women Higher percentage of neonatal depression by Apgar score of (0-6) in 1st minute was seen in 39.6% in primiparas compared with 31.4% in multipara that is statistically significant (p-value=0.016). Improvement of neonatal depression in 5th minute of Apgar score was significantly higher in multiparous group (p-value=0.001).. There was no difference in the rates of fetal birth asphyxia between neonates of primiparas and the neonates of multiparous (46.68% vs50.0%, respectively; p=0.162). But birth traumas were significantly more frequent in the primiparous compared with multiparous (40.0% vs 30.0%, p=0.023). Higher percentage (43.4%) of neonates needed admission in primiparas group compared with 33.3% in multiparas; that is statistically significant (p= 012).

Majority of the neonates admitted in neonatal ward due to birth asphyxia in both of the groups (39.1% in primiparas versus 41.1% in multiparas mothers). Neonatal admission due to birth trauma (bruises, fractures of the bones, intracranial hemorrhage) is more frequent in primiparas compared with the multiparas (21.7% versus 5.9% respectively) shown in table-4.

Table-4: Comparison between causes of neonatal admission in both the groups

Causes of Neonatal admission	Primiparas mothers		Multiparas mothers	
	Number	Percentage	Number	Percentage
Birth Asphyxia	09	39.1	07	41.1
Birthtrauma	05	21.7	01	05.9
Neonatal Jaundice	06	26.1	08	47.1
Umbilical sepsis	01	04.4	00	00
Neonatalsepsis	02	08.7	01	05.9

Discussion:

During this study period, total number of deliveries in that maternity unit was1621. Among them, 104 (6.41%) were in breech presentation and the rest 1517 (93.59%) were in other presentations It indicates that the percentage of breech delivery in this study was 6.41% that was comparable with the findings of some other accepted observations where it was 3-4% at 38-40 weeks of gestation.[1, 34] Among the women with breech presentation, vaginal deliveries were 10 out of 53 patients (18.9%) in primiparas compared with 18 out of 51 (35.3%) in multiparous mothers .So, cesarean deliveries were higher in both the groups with breech presentations. This higher rate of cesarean deliveries may be due to avoiding of arrest of after coming head of breech in vaginal delivery. Hannah et al. showed similarly in 2000 from 121 centers in 26 countries among 2083 women with singleton complete breech presentation where cesarean delivery was 71.7% that was remarkably higher than vaginal delivery (28.3%).[3] It is commonly thought that vaginal delivery is not a preferred method in breech presentation, especially in nulliparous women. This thinking is well supported by different authors[1-7,9-14,16,18,21]. Diro et al observed that vaginal breech delivery is 50% in nulliparous 60 compared to 75.8% in multiparous women.[35]Similar findings were also reported in another study in Turkey where only 32.2% of nulliparous women were undergone vaginal breech delivery. In case of multiparous women, vaginal delivery was chosen in more than double (75.04%) of the nulliparous group.[26]The present study also shows primiparous were not the common candidates for vaginal delivery where only 18.9% underwent this method.This observation is consistent with the reporting of the previously quoted authors. Different findings were also noted in other studies where vaginal delivery was the commonest method in breech primiparous that is contrary to the present study.[27-29] Most of the primiparous with breech presentation were not considered as the candidates for the trial of vaginal delivery in our institution as because majority of the patients admitted with labor pain with undetermined stage of labor, cesarean delivery might be higher in primiparas compared to multiparas women.

Moreover, the higher ratio of caesarean section in this study is probably due to inadequate or no antenatal care and lack of pre-delivery assessment of the patients for breech delivery currently in our hospital. It is noted that only 22.7% primiparous women was delivered successfully per vaginally who were the candidates for planned vaginal delivery. But none of them was delivered vaginally who were the candidates for planned cesarean sections .In primiparas women, cesarean delivery was the commonest method even if they were selected for vaginal delivery. On the contrary, successful vaginal deliveries were higher (45%) in multiparas women with breech presentation planned for vaginal delivery. Appropriate selection of method of delivery contributes better success especially in case of 61 multiparas. Diro et al. showed the comparable results where multiparas women showed more successful vaginal delivery in breech presentation.23 The evaluation of patients' baseline characteristics showed that the mean age of the primiparous women was 24.58± 5.16 years and multiparas was 28.9± 6.14 years Comparable results are seen in a study by Giuliani et al. where the mean age of pregnant mothers was 28.7±5.1 years versus 28.2±4.7 years respectively.40 Breech delivery is more common among the women aged less than 30 years in some other studies too.[15, 21-24] The reason for this young age is the relative increased gravidity and parity at a younger age in our society. The mean gestational age in this study for primiparas was 38.14± 1.45 weeks and for multiparas, it was 39.16± 1.53 weeks .This finding is almost nearer to the observations in another study in Austria where the mean gestational age was 39.9±1.4 weeks and 39.9±1.2 weeks in caesarean delivery group and vaginal delivery group respectively.[41]It indicates that parity does not influence the gestational age of the fetus in breech presentation. In this study, birth weight of the babies in primiparas was 3134.67± 344.51 grams and for multiparas, it was 3246.87± 433.23 grams. Again, 5-minute APGAR score in primiparas women and in multiparas was 8.1± 1.0 versus 8.3± 1.3 respectively (Table- 1). There were no remarkable differences in both the parameters. Authors in different studies evaluated the similar findings.[18, 21, 26]

The mean gestational age of the primiparous group was

38.4±1.0 weeks and for multiparous group 38.3±0.9weeks respectively that do not show any remarkable differences related to parity. Nkwabong E et al. also found no significant differences related to parity that favors this findings.38 20.8% of the primiparous mothers and 25.5% of vaginal group had no ante-natal check-up in this study that was not statistically significant (p=0.11). Rest of the participants had either regular or irregular ante-natal check-up (ANC). So, parity was not considering factor to the families of the pregnant women. In this study, rural and urban mothers were not discriminated, but overall candidates for ante-natal care were remarkably high in the context of some previous reporting from Bangladesh.[27-29] In a study from northern area of Bangladesh showed that only half of the rural women received ANC, although few more percentage added to the urban areas.[27] Most of the patients in both the groups belonged to average height and weight. Mean height in primiparas and multiparas women were 150.3±3.8 and 152.2±4.7cm respectively that was not statistically significant (p=0.53).Height is an important parameter for neonatal outcome described in some studies.[50, 51] Height less than 145 cm irrespective of parity is correlated with bad obstetrical outcome.[30] In this study, average height of the mothers in both the groups was above this limit that would not affect neonatal morbidity. Mean weight in primiparas and multiparas group were 66.3±5.5 kg and 67.2±5.7 respectively, p=0.17.Here, these findings elucidate 63 that maternal anthropometric criteria do not significantly affect the outcome in this study in context of the parity with breech presentation. Among the primiparas, 15 out of 53 (28.3%) babies were born with complications and the rest (71.7%) were healthy live births. On the contrary, higher percentage (80.4%) of delivery of healthy live births was observed in multiparas women Here, multiparas women with breech presentation showed better neonatal outcome as a whole irrespective of mode of delivery process. Similarly, majority of multiparas with breech presentation were delivered without any neonatal morbidity demonstrated in different studies.[31, 32] Although, Mode of delivery was an important factor in anotherstudy[33], and outcome was focused mainly in this study not considering the delivery process. Several neonatal complications were noted in both the groups like still birth, birth asphyxia, different birth traumas (injury to the brachial plexus, fracture, soft tissue injury, hemorrhage, facial nerve palsy, etc.) and neonatal death above all.Neonatal mortality accounted for 6.66% in primiparas and 10% in multiparas (p>0.05)in this study whereas Erkaya et al. reported 0.8% neonatal mortality in delivery with breech presentation.[24]This relatively high mortality was probably due to heavy patients' load despite prompt and appropriate intervention in neonatal care unit. Like neonatal mortality, still birth did not show any remarkable difference in both the groups. A study in the United Arab Emirates regarding obstetrical outcome of breech multiparas women 64 informed no significant increase in perinatal mortality rate among them compared to counterpart that supports the findings of this study.[26] Neonatal mortality has been used traditionally as a measure of the quality of care. Recently neonatal morbidity is being taken into account to assess the burden of the disease. It is estimated that 71.7% in primiparas and 80.4% in multiparas group (p>0.05) had no fetal morbidity. This good outcome may be the reflection of ready availability of emergency obstetric services. There was no difference in the rates of fetal birth asphyxia between neonates of primiparas and neonates of multiparous (46.68% vs50.0%, respectively; p=0.162). Although birth asphyxia was accounted as a major disease burden irrespective of parity like some other overseas studies.[17, 28] Unlike other fetal complications, birth traumas were significantly more frequent in the primiparous compared with multiparous (40.0% versus 30.0%, p=0.023). This finding is supported by a Canadian article where it is described that neonatal trauma, especially genital trauma is more common among the primiparous breech delivery.[29]Moreover, Erb's paralysis, soft tissue injuries were also common in breech deliveries in primiparas noted by different authors.[10,21] Higher neonatal trauma in primiparas may be due to lack of timely decision of operative delivery, proper delivery assistance during vaginal delivery and tight perineal ligaments as well. Admission to the Neonatal Intensive Care Unit (NICU) was 43.4% versus 43.3% in primiparas and multiparas group respectively; that is statistically significant (p=0.012) [25].It reflects higher percentage of neonatal admission for special care compared to international standard.41In primiparous group, lack of planned vaginal breech delivery and improper ante-natal care can be the causative explanation. In addition, delayed referral and no previous experience of the parturient ladies and tight perineal ligaments may be probable explanation of higher rate of fetal complications. On the other hand, in multiparas group, most of the pregnant women were undergone home trial before arriving to the hospital as they may have previous experience of successful home delivery. Therefore, in these late cases, the neonates had the increased tendency to develop complications and needed NICU support.[27] Here, 39.1% in primiparas group and 41.1% in multiparas admitted neonates suffered from birth asphyxia which was the commonest cause of NICU admissions in both the groups. There was no remarkable difference in percentage of asphyxiated children in both the groups in this study as supported by the findings of another author.[20]Jaundice was commoner among the babies in multiparas women (47.1%). Higher percentage of neonatal jaundice among those babies was probably due to major

and minor blood group incompatibilities observed in subsequent pregnancies.[12,23] Although increased neonatal morbidity is not a common picture in multiparas described by different authors.[14, 25] Unlike other conditions like neonatal sepsis and umbilical sepsis, as birth trauma was common among the babies of primiparas, neonatal admission due to trauma was also common to them (21.7% versus 5.9% in primiparas and in multiparas respectively) [16] similar to that found by Hameed et al65and Uhing MR.66It is well known that duration of all stages of labor in primiparas are prolonged compared to multiparas women. Risk of neonatal trauma and fetal depression is significantly more with prolonged first stage of labor described by Perl FM et al.[27]Thereby, it can be well be explained the more percentage of neonatal trauma found in this study with primiparas women with breech presentation. Apgar scoring is used commonly for initial neonatal evaluation following delivery. In this study, Apgar score of (0-6) was seen in 39.6% in primiparas and 31.4% in multiparas group in 1st minute. At 5th minute, 24.5% of primiparas and 11.8% of multiparas group scored below [7]that is statistically significant ($p < 0.05$). Babies delivered by primiparas' women are significantly more prone to develop fetal depression in this study and this finding is supported by different authors' abroad.[19, 27] Increased number of neonates with low Apgar score in primiparas group is probably due to lack of planned delivery methods with proper monitoring, not detecting prolonged first stage of labor that is commonly practiced in developed centers worldwide. Like neonates, maternal mortality and morbidity is considered as the good indicator for a quality care. Only 3.7% of primiparas mother and 9.7% of the multiparas suffered from post-partum hemorrhage (PPH), none of them had no major casualties .PPH is considered as a leading cause of maternal morbidity and mortality worldwide.[28] Although significantly higher incidence of PPH is noted among the multiparas probably due to post-delivery uterine inertia, overall low figure of this complication in this study [17] reflected the prompt and appropriate intervention given to the patients with hemorrhage in this tertiary setting. Genital tract injuries were 5.7% in primiparas and 7.8% in multiparas women ($p < 0.05$). Moreover, anesthetic complications (5.8%) and shock (1.9%) was found significantly higher in multiparas. Single incidence of retained placenta was observed in both the groups. Again, 86.8% in primiparas and 72.5% in multiparas did not suffer from any type of maternal complications during delivery process that reflected better obstetrical care. Multiparas mothers suffered most during puerperium in all context compared to primiparas women that is statistically significant ($p < 0.05$). In this study, multiparas mothers suffered almost double due to urinary tract infection and significantly higher due to wound infection as supported by Jadoon S.etal [29] probably due to more manipulation of adhesion of previous operation and keeping the urinary catheter for prolonged period. Fever was the commonest maternal ailment in both the groups. This higher value may be due to excess patient load and lack of appropriate infection control measures in post-operative period even in the tertiary hospital. Policy of planned delivery method irrespective of parity is substantially better for singleton fetus in breech presentation at term with lower perinatal mortality and morbidity rates. Maternal mortality and morbidity is also a major concern.

Conclusion:

In brief, planned caesarean section deliveries irrespective of parity have decreased rate of adverse perinatal outcome, although maternal morbidities are more in puerperium. It suggests vigilant intra-partum monitoring and appropriate management protocol for delivery methods in breech presentation may balance the maternal and fetal outcome. Primiparous mothers with breech presentation are more prone to undergo cesarean deliveries and thereby develop post-operative complications. But multiparous mothers have more complications during delivery process. Overall neonatal complications especially the birth traumas are more common among the babies of primiparous mothers. Therefore, efforts should be made to follow the an appropriate management protocol to choose planned delivery methods for each and every cases of breech presentation to prevent unwanted maternal and fetal outcome.

Recommendation:

There is no wide scale study in Bangladesh on fetal and maternal outcome in breech deliveries including the evaluation of predictive factors for breech presentation. Though Rangpur Medical College is the biggest tertiary care hospital in this region, these results do not reflect the overall situation existing all over the country. So, large scale study on this topic can be done to gather information that might help in preparing standard management protocol for breech presentation. There are some more suggestions:

- All the patients should have regular ante-natal check-up. Routine investigations should be advised to exclude mal-presentation and other complications.
- External cephalic version (ECV) can be practiced in possible cases that will prevent unnecessary caesarean section and thereby reduce maternal complications in puerperium.
- All breeches should be delivered at hospital where facilities for caesarean section are available.
- Patients should be properly counseled regarding possible problems of each delivery methods before delivery.
- Patients should be closely monitored with partograph in

labor room, if possible.

- Lastly, birth process in breech presentation should be conducted in presence of skilled medical personnel and importantly neonatologists when available.

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Total serum level of T_3, T_4 and TSH in female school going children of Northern Area of Bangladesh

*Rawshan Ara Begum[1], Md. Abdul Hakim[2], Chandra Rani Sarker[3]
Md. Abdullahil Mosawuir[4], Md. Rashed Mizan[5]

Abstract:

Background: iodine deficiency is a global public health problem. At least two billion people in the world were suffering from inadequate iodine intake, of which two hundred eighty five million were school aged children. Female are more vulnerable than male.

Measurement of thyroid hormones in rural and urban female school going children may give an idea about thyroid status of our female children and also helps to develop awareness about prevention of thyroid disorders.

Objectives:This study was carried out to assess T_3, T_4, and TSH in urban and rural female school going children who apparently look euthyroid without any visible goiter. Subclinical hypothyroid state, if found will be helpful in taking preventive measures

Key words: *Serum T_3, T_4, TSH, Iodized salt.*

Introduction:

Iodine is required for normal thyroid activity. There are increased thyroid activities during rapid growing periods of puberty. Low iodine intake has wide range of adverse effects on health in this period[1]. These effects are manifested by goiter, decreased serum thyroid hormones, increased serum thyroid stimulating hormone of the children.[2]

Iodine deficiency disorders are widely prevalent in a chronic environmental iodine deficient region. In chronic iodine deficient areas, apparently normal school going children attain a lower mental and psychomotor level, an affect potentially grave consequences for adult life.[3]

Iodine deficiency is a global public health problem and is the main cause of preventable mental retardation. At least two billion people in the world were suffering from inadequate iodine intake. Two hundred-eighty five million school-aged children from above mentioned population were suffering from iodine deficiency.[4-9]

The present study was aimed at evaluation of thyroid status in growing children who apparently look euthyroid without any visible goiter. Subclinical hypothyroid state if found among apparently normal children will be helpful in taking preventive measures. So that in futures the children born in iodine deficient areas will always be at part in all respects with the children of the non-goitrous region.

Bangladesh is a developing country, majority of the people live in the rural area. They are ignorant about thyroid disorders. So this study will be helpful to assess the thyroid status of school-going children as well as to adapt appropriate measure to prevent this deficient condition that may contribute in building a wise nation.

Materials and Methods:

This cross sectional study was carried out in the Department of Physiology, Rangpur Medical College, between July 2007 and June 2008. Study was conducted on a total number of hundred school going children, age ranging from 10 to 15 years. From these 27 are rural female and 29 are urban female school going children.

1. Associate Professor, Dept. of Physiology, Rangpur Community Medical College, Rangpur
2. Assistant Professor , Dept. of Forensic Medicine, Rangpur Community Medical College.
3. Professor and Head, Dept. of Physiology, Rangpur Medical College.
4. Associate Professor, Dept. of Physiology, Rangpur Medical College.
5. Medical Officer, Gongchara Upojella Health Complex, Rangpur.

*** For Correspondence***

Group A (n=29) = urban female school going children
Group B(n=27) = rural female school going children
Sampling method : By random cluster sampling

All the children of both groups had the residents of different areas of Rangpur district. Children with any other diseases were excluded from the study.

List of school in urban and rural area was collected, numbering was done. Then from these schools, selection of school was done by using random numbertable. From the numbers of student, lottery was done.

After selection, all the subjects were asked to attend the department of Physiology, Rangpur Medical College. History of intake of iodized salt was taken. All children enrolled for the study were asked to bring a teaspoon of salt which was tested for iodine content by the rapid iodine spot test. The change in colour of the salt after the addition of a drop of starch solution was matched with the colour given on the test kit.

Data Analysis method:

All data were recorded systematically in a preformed history sheet and all statistical analysis was done by using the soft were SPSS 12.0 for Windows. Comparisons of serum T_3, T_4, TSH between two groups were done by unpaired t-test. P values <0.05 were considered significant.

Laboratory facilities:

Centre for Nuclear Medicine and Ultrasound, Rangpur.

Collection of blood and sample processing:

5 ml of venous blood was collected from ante-cubital vein of each subject with all aseptic precautions by a disposable syringe. Test tubes were kept in slanting position till formation of clot. Serum was separated by centrifuging the blood at 3000 rpm for 5 minutes. The clear supernatant serum was taken and kept in one screw-capped dry clear vial and was preserved for estimation of serum thyroid hormones and serum thyroid stimulating hormone at -20^{O}C. All the tests were carried out as early as possible.

Laboratory Investigation:

Bio-chemical analysis of serum were carried out for the estimation of-

1. Serum thyroxine by Radioimmunoassay (RIA).
2. Serum triiodothyronine by Radioimmunoassay (RIA).
3. Serum thyroid stimulating hormone by Immunoradiometric assay (IRMA) in the laboratory of Center for Nuclear Medicine and ultrasound, Rangpur, Bangladesh.

Results|:

T_3 (triiodothyronin)

The mean ± SE of T_3 in the urban and rural female school going children were 1.76 ± 0.05007 and 1.18 ± 0.0479 respectively. There was significant difference between the two groups ($P < 0.001$).

T_4 (thyroxin)

The mean ± SE of T_4 in the urban and rural female school going children were 88.59 ± 1.478 and 78.48 ± 1.025 respectively. There was significant difference between the two groups ($P < 0.001$).

TSH

The mean ± SE of TSH in the urban and rural female school going children were 2.39 ± 0.075 and 3.48 ± 0.106 respectively. The mean serum TSH level of rural school-going children was significantly higher than the urban school-going children ($P < 0.001$).

Table I

Mean ± SE of Serum T_3, T_4, TSH level (n mol/L) in urban and rural female school-going children

Parameters	Group A (Urban) Mean ±SE	Group B (Rural) Mean ±SE	Value of "t"	Value of "p"
Serum T_3 level	1.76 ± 0.05007	1.18 ± 0.0479	7.82	<0.01
Serum T_4 level	88.59±1. 478	78.48±1.025	5.62	<0.001
Serum TSH level	2.39±0.075	3.48 ± 0.106	8.4	<0.001

Iodized salt

Out of 29 urban children, all had the history of taking iodized salt. On the other hand, out of 27 rural children, 20 had the history of taking iodized salt. Others take iodized salt infrequently. Twenty five cooking salt sample were collected from rural school-going children for presence of iodine. Out of 25 salt sample, only 10 (40%) salt sample were iodized and 15 (60%) were non- iodized.

Discussion:

The present study was undertaken to compare the serum T_4, T_3, TSH levels in urban and rural female school-going children in Rangpur district. Children of growing age have increased iodine demand. They are particularly vulnerable to less iodine intake, because juvenile thyroid is less able to compensate for a low iodine environment. The rural

area in this study is a flood prone area and it is in the northern part of Bangladesh.

The mean serum TSH level of rural female school-going children was significantly higher than the serum TSH level of urban school-going children ($P < 0.001$) but all TSH levels in both groups were within normal physiological limit.

Some observed high TSH level in rural children due to iodine deficiency.[14] Some others also observed high TSH level in rural children in spite of USI program.[15] They concluded that high TSH level in rural children was due to intake of natural goitrogens.

In rural female children serum T_4 and T_3 levels were significantly lower than the urban children ($P <0.001$). These lower levels of thyroid hormones may be the cause of increased serum TSH level in rural children and these lower thyroid hormones levels may be due to decreased iodine in the serum of these children. The causes of this sub clinical hypothyroidism may be due to iodine deficiency.

Results of salt analysis for iodine content reveals that 40% of the population in the studied area was consuming non-iodized salt while 60% of the population was consuming iodized salt. Further analysis showed that 40 % consuming salt contain iodine. Higher percentage of household consuming non-iodized salt could be due to higher price of iodized salt with low purchasing power of the people in study area. This result is similar to those of others.[16]

From the present study it is difficult to draw any direct conclusion regarding etiology of such condition but from indirect evidence as discussed earlier it may be concluded that sub-clinical hypothyroidism is common in rural female school-going children who could be due to less iodine intake from food and limited consumption of iodized salt and also take goitrogenic substances like cabbage, cauliflower, turnip. These results are similar to those[10-13] who reported high goiter prevalence in rural female children was due to inadequate iodized salt consumption.

Conclusion:

In light of above discussions, it may be concluded that lower levels of serum T_3 and serum T_4 in rural female school-going children in this study may be due to less iodine intake. They also give the history of taking goitrogenic substances like cabbage, cauliflower as main vegetables. Use fullness of iodine in the development of normal physio-psychological function is not well informed to rural people where the study was conducted. Again economical constrain also play a pivotal role for consumption of non-iodized salt by the rural people. So, the role and importance of iodine in the physio-psychological development should be published more vigorously in mass media for better awareness. Iodized cooking salt may be supplied to such a goiter prone area at a subsidized rate to improve the sub clinical goiter prevalence. Use of iodized salt is encouraged to overcome the situation observed in the group studied.

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Study of Excised Breast Mass and Comparison by Diagnostic Tool of FNAC and Histopathology for Diagnosis of Carcinoma Breast

*Ayesha Nasrin Suravee[1], Md. Abdul Quayum[2], Md. Rezaul Alam[3]

Abstract:

Background: *The differential diagnosis of a lump in the female breast is one of the most important clinical problems that arise in relation to this organ. It is one of the most common symptoms of breast diseases that cause women to seek advice from their clinician. The main problem of breast lump consists in its risk of being malignant. The incidence of lesions of the breast where FNAC or excision biopsy is indicated is missed due to that many women with breast lump that are benign on clinical examination never undergo biopsy. Furthermore, many small fibro adenomas in female adolescents are observed frequently.* ***Objective:*** *To evaluate the findings of FNAC open biopsy. To compare between two findings for diagnosis of breast carcinoma.* ***Methods:*** *A cross sectional study was conduct between January, 2008 to December, 2009 at Rangpur medical college hospital,Rangpur, Bangladesh. This is a hospital based prospective study.* ***Result:*** *In this study the sensitivity of FNAC is 90.4% for the presence of carcinoma and the specificity is 100% for the absence of malignancy. The positive predictive value is 100% and negative predictive value is 93.5% and the overall diagnostic accuracy of this series is 96%.* ***Conclusion:*** *Breast lump is a common surgical problem. A twentythree months prospective study was carried out to evaluate the effectiveness of fine needle aspiration cytology (FNAC) as a diagnostic method. Fifty cases of clinically palpable breast lumps were subjected to FNAC. In all cases tissues were examined histologically after excisional biopsy or definitive surgery. Results of FNAC were compared with histological diagnosis.*

Keywards : *Breast lump, FNAC & Histopathology.*

Introduction:

The differential diagnosis of a lump in the female breast is one of the most important clinical problems that arise in relation to this organ. It is one of the most common symptoms of breast diseases that cause women to seek advice from their clinician. The main problem of breast lump consists in its risk of being malignant[1].

Although in majority of cases a provisional diagnosis can be made on the basis of thorough history taking, careful assessment of physical characteristics use of an orderly sequence of investigation is required in nearly all the cases of breast lump to attain a definite diagnosis. Mammography is a useful method for diagnosing breast disease even before a mass becomes clinically palpable. Yet false-positive and false-negative results occasionally occur. About 5% of palpable lesions may be missed during mammography because of their location or the breast is being extremely dense[1]. So it is not recommended in women before the age of 30 years. Often it does not reveal modularly type of cancer. Other diagnostic methods, such as fine needle aspiration cytology, Ultrasonography, incision biopsy etc. are also important investigations for the diagnosis of breast lump[2].

The incidence of lesions of the breast where FNAC or excision biopsy is indicated is missed due to that many women with breast lump that are benign on clinical examination never undergo biopsy. Furthermore, many small fibro adenomas in female adolescents are observed frequently[3].

1. Assistant Professor, Dept. of Surgery
   Rangpur Community Medical College, Rangpur
2. Professor, Dept. of Surgery
   Rangpur Medical College, Rangpur
3. Assistant Professor, Dept. of Dermatology
   Rangpur Community Medical College, Rangpur

*** For Correspondence***

This is a small scale study. The purpose of which is to compare the accuracy of FNAC for the diagnosis of breast lump which may help for their correct diagnosis and thus reduce the incidence of surgery in benign breast disease.

Carcinoma of breast is one of the most dangerous causes of breast lump. Delay in diagnosis of carcinoma breast may lead to metastasis. Preoperative confirmation by histopathology is mandatory as treatment of carcinoma breast is not only the excision of lump but also may need to do mastectomy.

Open surgical biopsy was prerequisite formerly in most cases needed for breast surgery. So in many of these cases second surgery were needed after positive histopathological report. To minimize this problem, FNAC was introduced as a very simple procedure that can be performed in out patients department. As sensitivity and specificity of FNAC increases with modernization of technology it is now considered as important diagnostic tool for lump in body including breast lump.

There are many studies worldwide which compare between FNAC and histopathology of open biopsy for the diagnosis of breast lump but these types of studies are not known in Bangladesh. In this study we will correlate the findings of FNAC for the diagnosis of breast lump with histopathological report after surgery or open biopsy.

Material and methods:

A cross sectional study was conducted in Surgery department of Rangpur Medical College, Rangpur, Bangladesh. The study was carried out for a period of one year from January, 2009 to December, 2010. All female patients with breast lump of any age attended in Rangpur medical college hospital was the study population and the total number of cases were 70. Of them 60 were selected according to selection criteria mention here with. First diagnosis of breast lump was established by taking history, physical examination and investigation. Patients were assessed to make sure that they were within selection criteria.

Results:

Table I shows age distribution of the study population. The age distribution demonstrates that 30% of the patients ware less than 30 years, another 30% between 30-40 years and rest 40% more than 40 year of age.
Table II shows four (8%) of patients had a history of pain in the breast. Of them 2(50%) patient's pain was localized and 2(50%) diffuse.

Table III shows the clinical diagnosis. Before aspiration, clinical diagnosis were established by talcing thorough history and performing physical examination. Clinically a reasonably confident diagnosis could be made in 44 (88.0%) cases, of which 28 (56.0%) were diagnosed to be benign and 16 (32.0%) were to be malignant Of the remaining 6 (12.0%) cases the clinical diagnosis were uncertain and a suspicion of malignancy could not be ruled out.

Table IV shows the cytological diagnosis. Out of 50 cases, cytologically 26(52.0%) cases were found to be benign, 19(38.0%) cases diagnosed as malignant, 2(4.0%) cases were found to be suspicious of malignancy 2(4.0%) cases were reported atypical and in 1(2.0%) cases smears were unsatisfactory for cytological examinations.

Table V shows histological diagnosis of all patients. Histologically 29(58.0%) cases were benign and 21(42.0%) cases were malignant.

Table VI shows Fine Needle Aspiration Cytology (FNAC) of swelling detected that 38% of patients had carcinoma and 62% benign tumour. In histopathological examination, 42% of patients had carcinoma and 58% benign tumour. For calculation purpose suspicious & atypical groups from FNAC are included in benign groups.
Table VII shows the present study was intended to determine the accuracy of FNAC in diagnosing carcinoma breast. Before going to the test findings, it would be worthwhile to interpret the components of accuracy of a screening test against a confirmatory diagnosis, which is considered as the 'Gold Standard'.

Table I.

Distribution of patients by age (n =50).

Age (years)1	Frequency	Percentage
<30	15	30.0
30-40	15	30.0
>40	20	40.0

Mean age = 37.5 ± 13.1 years; range= 16- 60 years.

Table II.

Clinical presentation.

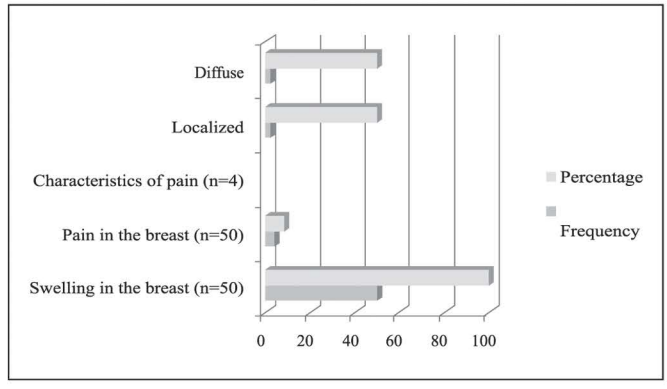

Table III

Distribution of patient by clinical diagnosis:

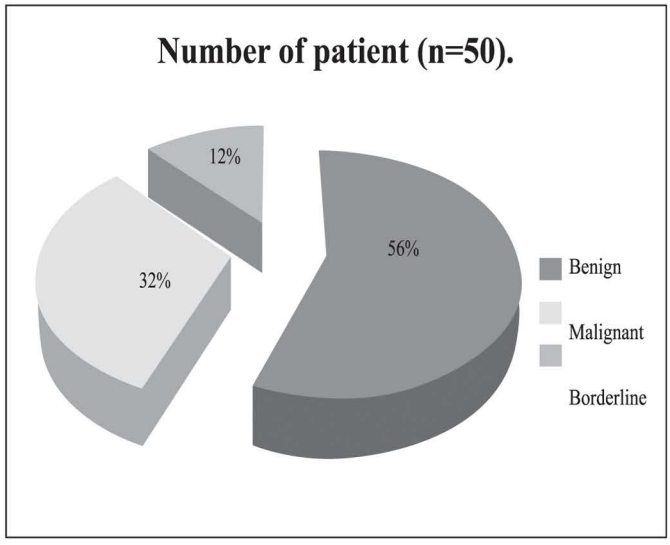

Table IV

Distribution of patients by Cytological diagnosis:

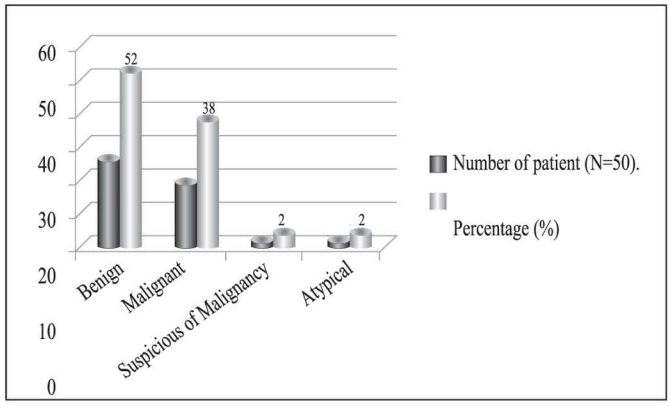

Table V

Distribution of patients by Histological Diagnosis

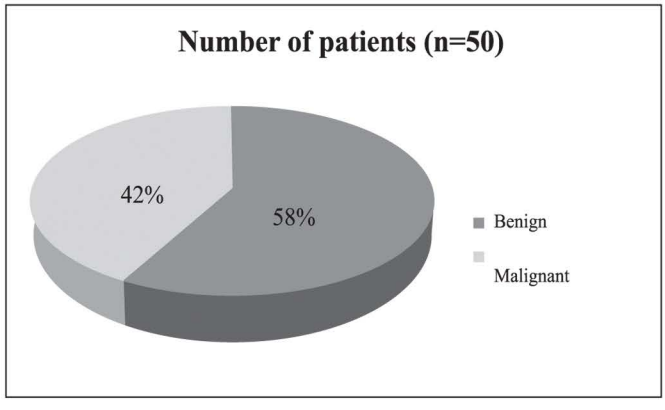

Table VI

Distribution of patients by age (n =50).

Diagnosis	Frequency	Percentage
FNAC		
Carcinoma	19	38.0
Benign tumou	31	62.0
Histopathology		
Carcinoma	21	42.0
Benigntumour	29	58.0

Table VII

Calculation of sensitivity and probability of disease after histopathological test.

FNAC	Carcinoma breast present	Carcinoma breast absent	Total
+veT	21 (a)	0 (b)	21
-ve-T	0(c)	29(d)	29
Total	**21**	**29**	**50**

Discussion:

Fine needle aspiration cytology is a diagnostic method which has been thoroughly validated in many tissue including thyroid, breast, lymph node, salivary gland, prostate and other tissues. The method permits the accuracy with which malignant cells can be identified by an experienced cytologist leaves the diagnosis of malignancy beyond doubt in cases where an adequate cytological sample is obtained.[4]

Though it is now widely used as a method of detecting the nature of tumor mass of various organs it has got a limited practice in our country, particularly outside Dhaka. It is necessary to use this method more widely in our country.[5]

The primary aim of my study was to determine diagnostic correlation between fine needle aspiration cytology report and the final histopathology of the breast lump. In other words, how accurate and reliable was FNAC in diagnosing breast pathology which could help us in proceeding towards definitive treatment without doing additional operation.[6,7,8]

Morphological diagnosis of lesion from cytological smears needs experience. In this study, the slides were grouped into four: a) malignant, b) benign, c) atypical, d) suspicious of malignancy.[9]

The clinical diagnosis was recorded as benign, malignant and borderline in which diagnosis was not certain. The final diagnosis was obtained in each case by histological

report of exisional biopsy. In the present study 50 cases were selected by inclusion and exclusion criteria's.[10, 11]

The result of present study reveal that when the tumours were examined by FNAC procedure 26 (52.0%) were diagnosed as benign, 19 (38.0%) malignant and 2 (4.0%) cases were suspicious of malignancy and 3 (6.0%) cases were atypical. All lesions with a cytological diagnosis of malignancy were confirmed by histological examination which could be considerd as gold standard test.[12,13,14,15]

Among thirty one (31) cases of benign tumors (For calculation purpose suspicious & atypical groups from FNAC are included in benign groups.) as diagnosed by cytological (FNAC) examination while re-examined by histological procedure twenty nine was confirmed benign and two were actually malignant. [16,17,18]

So both the test were equally specific in the diagnosis of ca breast. On the other hand positive predictive value for FNAC is 1 and negative predictive value is .94. There was no false positive cytologic diagnosis in this study. The overall diagnostic accuracy of FNAC is 96%. [19, 20]

A total of 89 cases of breast lump was handled by Aziz M et al in whom both FNAC and histopathology results were available for comparison. In malignant disease, sensitivity of the FNAC was 85.29% with 100% specificity, 14.7% false negative rate, 100% positive predictive value and 98.79% negative predictive value.[21,22]

In another retrospective study of 220 diagnosed cases of breast lesion done by Nggada HA et al 2007[24] at the University of Maiduguri Teaching Hospital (UMTH), Nigeria between the periods of January 2001 and December 2005 had showed the diagnostic accuracy of FNAC was 97.7%, sensitivity was 95.7%: and specificity was 98.7%. The false negative and false positive rates were 2.9% and 1.9% respectively.[23, 24]

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Some Aspects of Diabetes Mellitus Concludes Ophthalmic Complication

*Md. Masudul Haque[1]

Abstract:
Diabetes it is a chronic metabolic disease and is leading cause of blindness in the world. Blindness is mainly due to diabetic retinopathy. As the incidence of diabetes increases worldwide, so does the incidence of its complications including diabetic eye disease. Approximately one third of total diabetic eye diseases related to diabetes. People with diabetes need to play an active role in managing their disease to prevent complications affecting their quality of life.

Key words: *Retinopathy, Macula, Exudates, Microaneurysms.*

Introduction:

Diabetic is a chronic metabolic disease. According to WHO recently compiled data show that approximately 285 million people have diabetes mellitus worldwide and this number may well double by the year 2025. Much of this increasing will occur in developing countries and will be due to population growth, ageing, unhealthy diets, obesity and sedentary lifestyle.

As the incidence of diabetes increases worldwide, so does the incidence of its complications including diabetic eye disease. Approximately one third of total diabetic eye diseases related to diabetes include a range of condition such as diabetic retinopathy, refractive changes, double vision, cataract, glaucoma of these conditions diabetic retinopathy is the only one that is directly causes by diabetes and most frequently results in vision loss. Diabetic retinopathy is a leading cause of blindness globally.

People with diabetes need to play an active role in managing their disease to prevent complications affecting their quality of life.

Everyone with diabetes is at risk of losing vision. Good control of blood glucose, blood pressure and blood lipids will reduce the annual incidence of eye disease and vision loss and will prolong life. Timely treatment can pre vent almost all vision loss associated with diabetes and so regular eye exams become essential for all those living with diabetes.

1. Associate Professor, Dept. of Opthalmology
Rangpur Community Medical College

** For Correspondence*

Discussion:

An eye condition that is caused by diabetes – diabetic retinopathy

Diabetic retinopathy results from damage to the small blood vesssels of the retina through changes in the blood flow. Diabetic retinopathy can cause changes in the eye including;

Microaneurysms – small bulges in the blood vessels of the retina that can leak fluid into the retina.
Retinal haemorrhages – tiny spots of blood that leak into the retina.
Hard exudates – lipid deposits
Cotton wool spots – swollen ischaemic axons in the nerve fibre layer
Venous dilatation and beading.
Intraretinal microvascular abnormalities – abnormal branching or dilation of existing blood vessels
Abnormal new blood vessels –

Diabetic macular edema

Diabetic maculopathy affects the central part of the retina – the macula – which is important for central vision.

Refractive changes

Variations in blood glucose levels may cause changes in the refractive power of the eye. That goes away with control of diabetes.

Diplopia

Diplopia (double vision) is simultaneous perception of two images of a single object that is caused by damage to the nerves that control eye movement coordination. Diabetes is the leading cause of the nerve damage that disrupts normal eye movement.

Cataract

Cataract may affect people with type 1 diabetes. And age related cataracts tends to occur earlier among people with diabetes than people without diabetes.

Glaucoma

Glaucoma is a group of progressive conditions that result in damage to the optic nerve. It usually occur s when fluid builds up in the front part of the eye. Glaucoma can permanently damage vision in the affected eye, reducing peripheral vision and resulting in irreversible visual loss.

Conclusion:

Blindness due to diabetic eye diseases can be prevented by the following measures:

- Good diabetes control is the best way by healthy diet, smoking cessation, exercise and avoiding excessive weight gain to prevent diabetic eye disease.
- Regular eye checkup by eye doctor once every year.
- Control of risk factors like hypertension, hyperlipedemia, is very important in reducing the effect of diabetes in the eye.
- Early detection and treatment of retinopathy.

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Hypertensive Crisis

***Ratindra Nath Mondal[1], Moni Rani[2], Amaresh Chandra Shaha[3], Beauty Saha[4]**
Abdus Samad[5], M. H. Ansari[6]

Although prevalence of hypertension is increasing, hypertensive crisis is a rare condition, found only in less than[1] 1% due to improved management of chronic hypertension. Arbitrarily sudden life threatening increase of blood pressure is called hypertensive crisis. Hypertensive crisis is defined as a severe elevation in blood pressure, generally considered a diastolic blood pressure above 120 to 130 mm Hg. On the basis of absence or presence of acute or ongoing end-organ damage hypertensive crises classified as hypertensive urgency or as hypertensive emergency.[2]

Key words: Hypertension, Hypertensive emergencies, Hypertensive crisis.

Introduction:

Hypertensive emergency

Hypertensive emergencies are acute, often severe, elevations in blood pressure (DBP> 130 mm of Hg), accompanied by acute (or rapidly progressive) target organ dysfunction.[3] The most common hypertensive cardiac emergencies include acute myocardial infarction, unstable angina and acute aortic dissection. Neurologic emergencies % acute stroke, subarachnoid hemorrhage and hypertensive encephalopathy. Other hypertensive emergencies include eclampsia, postoperative bleeding from vascular suture lines, and epistaxis that cannot be controlled with anterior and posterior nasal packing.[3]

It is estimated that single-organ involvement is found in approximately 83% of hypertensive emergency patients, two-organ involvement in about 14% of patients, and multi-organ failure (failure of at least 3 organ systems) in about 3% of patients. The most common clinical presentations of hypertensive emergencies are cerebral infarction (24.5%), pulmonary edema (22.5%), hypertensive encephalopathy (16.3%), and congestive heart failure (12%). Less common presentations include intracranial hemorrhage, aortic dissection, and eclampsia.[3]

Hypertensive urgency

Asymptomatic severe hypertension (DBP>120 to 130 mm of Hg) in the absence of new or progressive target organ damage is hypertensive urgency.[1]

What are the difference between hypertensive emergency and urgency?

Points	Hypertensive urgency	Hypertensive emergency
1. Blood pressure level	1. DBP>120 to 130 mm of Hg	1. DBP >120 to 130 mm of Hg
2. Target organ damage	2. Absent	2. Present
3. Symptoms	3.Asymptomatic	3. Symptomatic
4. Physical examination	4. Normal except high BP	4. Apart from high BP may reveal grade 3 or 4 retinopathy and others findings according to target organ damage.
5. Investigation	5. Normal	5. Abnormal according to target organ damage.
6. Reduction of BP	6. Rapid reduction of BP not necessary	6. Rapid reduction of BP is mandatory.

1. Associate Professor, Dept. of Medicine
Rangpur Community Medical College
2. Post Graduate Trainee, Department of Medicine
Rangpur Medical College
3. Professor, Dept. of Medicine
Rangpur Community Medical College
4. Associate Professor, Dept. of Pharmacology
Rangpur Medical College
5. Assistant Prof. Dept. of Forensic Medicine
Rangpur Army Medical College
6. Assistant Professor, Dept. of Microbiology
Rangpur Army Medical College

**** For Correspondence***

Hypertensive encephalopathy and malignant hypertension are two hypertensive emergencies, these are discussed below.

Hypertensive encephalopathy

Hypertensive encephalopathy is a rare condition characterized by high BP and neurological symptoms, including transient disturbances of speech or vision, paraesthesiae, disorientation, fits and loss of

consciousness. Papilloedema is common. Brain imaging often shows hemorrhage in and around the basal ganglia,[4] and a posterior leukoencephalopathy, affecting mainly the white matter of the parieto-occipital regions[3]. However, the neurological deficit is usually reversible if the hypertension is properly controlled.

Malignant/accelerated hypertension

Characterised by accelerated microvascular damage with necrosis in the walls of small arteries and arterioles ('fibrinoid necrosis') and by intravascular thrombosis. The diagnosis is based on evidence of high BP and rapidly progressive end organ damage, such as retinopathy (grade 3 or 4), renal dysfunction (especially proteinuria) and/or hypertensive encephalopathy.[4] For diagnosis of malignant hypertension presence of retinopathy (grade 3 or 4) must be required.

The pathologic hallmark of malignant hypertension is fibrinoid necrosis of the arterioles, which occurs systemically, but specifically in the kidneys. These patients develop fatal complications if untreated, and more than 90% will not survive beyond 1-2 years.

Causes of hypertensive crisis

Most often in patients with a known history of preexisting hypertension.[5] A hypertensive crisis also may be superimposed on other diseases that cause hypertension, particularly renovascular disease, renal parenchymal disease, and pheochromocytoma.

Causes of hypertensive crisis

1. Abrupt increase in blood pressure in patients with chronic hypertension (commonest cause)
2. Renovascular hypertension
3. Parenchymal renal disease (chronic)
4. Scleroderma and other collagen vascular diseases
5. Use of certain drugs, particularly sympathomimetic agents (eg, cocaine, amphetamines, PCP, LSD)
6. Withdrawal from antihypertensive agents (usually centrally acting agents such as clonidine)
7. Ingestion of tyramine-containing foods, tricyclic antidepressants, or other sympathomimetics combined with MAO inhibitor therapy
8. Preeclampsia, eclampsia
9. Pheochromocytoma
10. Acute glomerulonephritis
11. Head injury
12. Renin-secreting or aldosterone-secreting tumor
13. Vasculitis
14. Autonomic hyperactivity in presence of Guillain-Barré or other spinal cord syndromes[6]

Pathogenesis of hypertensive emergency

The pathophysiology of hypertensive emergency is not well understood. Failure of normal autoregulation and an abrupt rise in systemic vascular resistance are typical initial components of the disease process.[7]

Hypertensive emergency pathophysiology includes:

- Abrupt increase in systemic vascular resistance, likely related to humoral vasoconstrictors
- Endothelial injury
- Fibrinoid necrosis of the arterioles
- Deposition of platelets and fibrin
- Breakdown of normal autoregulatory function

The resulting ischemia prompts further release of vasoactive substances, completing a vicious cycle.[8] Patients with a hypertensive crisis frequently have a thrombotic microangiopathy with severe microvascular abnormalities resulting in renal or cerebral dysfunction.9

Clinical features

Symptoms of hypertensive emergency are non-specific like headache, vomiting, faintness, vertigo, agitation, Paresthesias etc. Patients may complain of specific symptoms that suggest end-organ dysfunction may be present. Chest pain may indicate myocardial ischemia or infarction, back pain may denote aortic dissection; and dyspnea may suggest pulmonary edema or congestive heart failure. The presence of neurologic symptoms may include seizures, visual disturbances, and altered level of consciousness (hypertensive encephalopathy).

The physical examination should assess whether end-organ dysfunction is present. BP should not only be measured in both the supine position and the standing position (assess volume depletion), but it should also be measured in both arms (a significant difference may suggest aortic dissection). The presence of new retinal hemorrhages, exudates, or papilledema suggests a hypertensive emergency. Evaluate also for the presence of heart failure, which may be indicated jugular venous distention, crackles on auscultation, and peripheral edema. Central nervous system (CNS) findings may include changes in the patient's level of consciousness and visual fields, and/or the presence of focal neurologic signs. Abdominal masses or bruits may be noted.

Investigation

Diagnosis is usually clinical. Presence of target organ damage needs to be confirmed by some investigations. Obtain electrolyte levels, as well as measurements of blood urea nitrogen (BUN) and creatinine levels to

evaluate for renal impairment. A dipstick urinalysis to detect hematuria or proteinuria and microscopic urinalysis to detect red blood cells (RBCs) or RBC casts should also be performed. A complete blood cell (CBC) and peripheral blood smear should be obtained to exclude microangiopathic anemia, and a toxicology screen, pregnancy test, and endocrine testing may be obtained, as needed. In hypertensive encephalopathy- hemorrhage in and around the basal ganglia,[4] and a posterior leukoencephalopathy, affecting mainly the white matter of the parieto-occipital regions.[3]

Management

Hypertensive emergency

Hypertensive emergencies require immediate intensive care unit (ICU) admission for intravenous therapy and continuous blood pressure monitoring. In most hypertensive emergencies, the goal of parenteral therapy is to achieve a controlled and gradual lowering of blood pressure. A good rule of thumb is to lower the initially elevated arterial pressure by 10% in the first hour and by an additional 15% during the next 3 to 12 hours to a blood pressure of no less than 160/110 mm Hg. Blood pressure can be reduced further during the next 48 hours. Dose of intravenous antihypertensive drugs are discussed below.[3]
Usual intravenous dose of antihypertensive agents used in hypertensive emergencies[10].

Name of the drugs	Dose
Nitroprusside	Initial 0.3 (mg/kg)/min; usual 2 –4 (mg/kg)/min; maximum 10 (mg/kg)/min for 10 min.
Nicardipine	Initial 5 mg/h; titrate by 2.5 mg/h at 5 –15 min intervals; max 15 mg/h.
Labetalol	2 mg/min up to 300 mg or 20 mg over 2 min, then 40–80 mg at 10-min intervals up to 300 mg total.
Enalaprilat	Usual 0.625–1.25 mg over 5 min every 6 – 8 h; maximum 5 mg/dose
Esmolol	Initial 80–500 mg/kg over 1 min, then 50 – 300 (mg/ kg)/min.
Phentolamine	5–15 mg bolus.
Nitroglycerin	Initial 5 mg/min, then titrate by 5 mg/min at 3–5 min intervals; if no response is seen at 20 mg/min, incremental increases of 10 – 20 mg/min may be used.
Hydralazine	10–50 mg at 30-min intervals

Start with the lowest dose. Subsequent doses and intervals of administration should be adjusted according to the blood pressure response and duration of action of the specific agent.

Clevidipine for the treatment of acute hypertension

Clevidipine is a third-generation, intravenous, dihydropyridine calcium-channel antagonist. It was approved by the FDA in 2008 for the reduction of blood pressure when oral therapy is not feasible or desirable. The novelty of clevidipine is the ultra short half-life of about 1 minute and its potent arterial vasodilation ability without affecting venous capacitance or myocardial contractility. Clevidipine reduces the pressure that the heart's ventricles must generate to eject blood, yet has little to no effect on the pressure of blood that fills the heart's chambers prior to contraction. This results in the same volume of blood being pumped out of the heart, with less resistance to blood ejection, thereby protecting against inadequate blood flow to the heart's muscle and preserving coronary endothelial function. These effects are due to the minimal effects of the agent on stroke volume, cardiac output, or heart rate. Clevidipine also appears to have no significant adverse effect on heart rate. Clevidipine is available as an injectable emulsion and can be administered via a peripheral or a central venous catheter. An IV infusion at 1–2 mg/hour is recommended for initiation and should be titrated by doubling the dose every 90 seconds. As the blood pressure approaches goal, the infusion rate should be increased in smaller increments and titrated less frequently. The maximum infusion rate for Clevidipine is 32 mg/hour. Most patients in clinical trials were treated with doses of 16 mg/hour or less. This product is contraindicated in patients with allergies to soy products, eggs and egg products, or defective lipid metabolism.[11]

Weaning from intravenous antihypertensive therapy

After the blood pressure has been brought under acute control, oral labetalol and dihydropyridine CCBs are particularly useful agents in weaning patients from parenteral therapy so they can be transferred from the ICU. A few doses of intravenous furosemide are often needed to overcome drug resistance due to secondary volume expansion resulting from parenteral vasodilator therapy.

Whether use of sublingual nifedipine is safe in hypertensive emergency?

Excessive reductions in pressure may precipitate coronary, cerebral, or renal ischemia. To avoid such declines, the use of agents that have a predictable, dose-dependent,

transient and not precipitous antihypertensive effect is preferable. In that regard, the use of sublingual or oral fast-acting nifedipine preparations is best avoided.[12]

Hypertensive urgency. Hypertensive urgencies often can be managed with oral medications and appropriate outpatient follow-up in 24 to 72 hours.[3]

For management of the patient during the short interim period, labetalol is effective in a dose of 200 to 300 mg, which can be repeated in 2 to 3 hours and then prescribed in twice-daily dosing. If a â-blocker is contraindicated, clonidine is effective in an initial dose of 0.1 or 0.2 mg followed by additional hourly doses of 0.1 mg. Patients can be prescribed 0.1 to 0.2 mg twice daily on discharge. Captopril, a short-acting ACE inhibitor, lowers blood pressure within 15 to 30 minutes of oral dosing. A small test dose of 6.25 mg should be used to avoid an excessive fall in blood pressure in hypovolemic patients; then, the full oral dose is 25 mg, which can be repeated in 1 to 2 hours and prescribed as 25 to 75 mg twice daily.[3]

Prognosis

Severe hypertension is a serious and potentially life-threatening medical condition with a generally poor prognosis. It is estimated that people who do not receive appropriate treatment only live an average of about three years after the diagnosis has been established.[13]

Conflict of interest-none

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Rangpur Community Medical College
Medical East Gate, Rangpur
email: principal@rcmcbd.com
Tel: +88-0521-53881-2, Fax: +88-0521-61114

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