ISSN: 2313-4919

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REGARDING THE JOUNAL

Full Name of the Journal	Ad-din Medical Journal
Abbreviated Form	AMJ
Type of Publication	Peer Reviewed, Bi-Annual
Published by	Ad-din Sakina Women's Medical College
ISSN No.	2313-4919
Address	Pulerhat, Jashore-7402, Bangladesh

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Editorial

Black Fungus

*Akhter M

Mucormycosis informally called 'black fungus' is a rare fungal infection, with a very high mortality rate of around 54%¹. Covid-19 associated mucormycosis is not very common, but in recent months, India observed thousands of cases of mucormycosis in Covid-19 patients. Now the prevalence of mucormycosis in India is about 80 times higher than the prevalence in developed countries². Pakistan and Russia are also experiencing a surge. In the second week of June 2021, the devastating aggression of Covid-19 seems to decline a little in India. But in Bangladesh, particularly in the western border districts the picture was very fragile with rapidly increasing numbers of Covid-19 cases. Even few sporadic cases of Covid-19 associated mucormycosis have been identified in Bangladesh.

Mucormycosis (zygomycosis) comprises several different invasive fungal infections with the order mucorales. The responsible genera include Rhizopus, Mucor, Lichtheimia (formerly Absidia) and Rhizomucor. Saksenaea Cunninghamella, Apophysomycesetc. are less common causative agents³. Total 10 genera and 27 species of the order mucorales are involved in human disease. All species of these genera produce same disease appear morphologically identical tissues. These groups of fungi are present throughout the environment, rich in soil and decaying organic matter, such as leaves, compost piles, and animal dung4. The majority of mucormycosis is associated with Rhizopus spp. Humans acquire the infection mainly by inhalation of sporangiospores but acquisition of disease by ingestion of contaminated food or traumatic inoculation is also possible⁵.

Individuals with low phagocytes (neutropenia) or have impaired phagocytic function are at greater risk of mucormycosis.In case of hyperglycemia and low pH (diabetes mellitus and diabetic ketoacidosis), phagocytes become dysfunctional with impaired chemotaxis and defective intracellular killing abilityand thus prone to acquire mucormycosis. The risk increases manifolds with the concomitant use of steroid. Patients with increased iron load are also susceptible⁶. In addition to these, all types of cancer patients, patients with solid organ transplant or stem cell transplant, patients using corticosteroid for long, injectable drug abuser, patients with burns, wounds or surgery and prematurity and low birth weight neonates are at increased risk of mucormycosis⁷.

Mucormycosis is an opportunistic infection and patients with moderate to severe Covid-19 are more susceptible to it⁸. High dose corticosteroids and tocilizumab used to treat severe cases of Covid-19 might have played an important role in acquiring mucormycosis9. According to the statements of the treating physicians of 'black fungus' in India, the cause of the endemic situation of mucormycosismay have contributed by contamination in the pipe lines, face masks, cylinders and humidifiers used for oxygen. In addition to these, low oxygen (hypoxia in Covid-19), uncontrolled diabetes, high iron levels, immunosuppression by steroids, as well as prolonged hospitalization and mechanical ventilation have facilitated 'black fungus epidemic'. Although some of these hypothesis are yet to be established.

Presentations of mucormycosis depend on which part or organ system of the body is affected. It is mainly categorized into five main types according to the presentation and part of the body involved, namely rhinocerebral, pulmonary, gastrointestinal, cutaneous and disseminated mucormycosis ¹⁰. Rhinocerebral and pulmonary mucormycosis are prevalent in Covid-19 patients ¹¹. Rhinocerebral mucormycosis is the commonest and classic presentation of the

disease.

Initially symptoms and signs may include one-sided eye pain or headache or pain in the face, numbness, fever, loss of smell and runny nose or blocked nose. The face becomes swollen on one side and rapidly progressing "black lesions" appears across the nose and upper inside of oral cavity. The involved eye may become swollen and bulged with ocular palsy and blurred vision¹². Fever, cough, chest pain, dyspnea and hemoptysis may occur if the lungs are involved. Abdominal pain, nausea, vomiting and gastrointestinal bleeding can occur in case of intestinal involvement. In case of disseminateddisease involving the brain, there may be psychosis and other neurological symptoms, even coma¹³.

Provisional diagnosis is based on the history, physical examination, and evaluation of the patient's risk factors for mucormycosis, but a confirmatory diagnosis is challenging. So, culture (to identify species) and histopathology both are required. Presence of a fungal infection can be confirmed quickly by a touch preparation of skin biopsy³. Other supportive tests include a complete blood count, iron levels, blood glucose, bicarbonate, and electrolytes¹⁴. Imaging is usually performed to see the extent of involvement. CT scan of the lung, sinuses and brain are usually required¹⁵. Sometimes MRI is also indicated.

An aggressive treatment approach should be initiated immediately for mucormycosis. Most of the patient will need surgical interventions and medical treatments simultaneously.Intravenous Amphotericin B is the standard treatment and the liposomal preparation is preferred in case of CNS involvement. A combination of liposomal Amphotericin B and an Echinocandin may improve survival of the patient.Recombinant cytokines, hyperbaric oxygen, and/or granulocyte transfusions are considered as adjunct therapy for selected cases. Benefits of using iron chelator are still under evaluation¹⁶.

Patients with mucormycosis can experience

serious complications like blindness, osteomyelitis, pulmonary and gastrointestinal hemorrhages, meningitis, cavernous sinus thrombosis, brain abscess, cavitary lesions in organs, secondary bacterial infections and death.Prognosis depends on overall health, rapidity of diagnosis and effective treatment. Loss of vision, limbs and organ dysfunction is not uncommon in survivors¹⁷.

Emergence of Covid-19 associated mucormycosis at an epidemic level in India has complicated the pandemic situation of Covid-19 manifolds. Bangladesh shares a very large land border as well as intimate social and commercial relationship with this country that makes our country in an impending danger of Covid-19 associated mucormycosis outbreak. Management of this invasive fungal infection would be very challenging in Bangladesh regarding medical resources and cost.Early diagnosis as well as measures to prevent contamination, control of blood sugar, justified and limited use of steroids and antibiotics in Covid-19 patients appears to be the main objectives in preventing an outbreak of mucormycosis.

Dr. Marufa Akhter, Associate Professor, Dept. of Biochemistry, Ad-din Sakina Women's Medical College, Jashore.

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Original Article

Evaluation of Factors Responsible for Raised Intraocular Pressure Following Phacoemulsificationn

*Kamal MN

Background: This study was designed to analyze the risk factors resulting in high intraocular pressure (IOP), which was accepted as IOP higher than 22 mmHg, following uncomplicated phacoemulsification. **Materials and Methods:** The records of 812 eyes of 584 patients who underwent uncomplicated phacoemulsificationwere evaluated. There were 330 men and 254 women ranging between the age of 26 and 89 years (65.4 \pm 9.8 years). The preoperative, postoperative first day (day 1), first week (day 7), and first month (day 30) IOP values were analyzed. Data on history of diabetes, glaucoma, pseudoexfoliation (PXF), incision site, capsularstaining with trypan blue, and surgeon were recorded. A multinomial regression analysis was performed to analyze the relationship of the factors with postoperative high IOP. **Result:** The mean IOP was 15.6 ± 4.3 mmHg preoperatively. Postoperatively that were changed to 19.7 ± 9.0 mmHg at day 1, 12.7 ± 4.5 mmHgat day 7, and 12.8 ± 3.7 mmHg at day 30. The factors such as surgeon, presence of PXF, diabetes, surgicalincision site, and trypan blue were not related to the postoperative high IOP (P > 0.05), in all). The onlyfactor that related to high IOP at all visits was glaucoma (P < 0.005). **Conclusion:** According to our results, preoperative diagnosis of glaucoma seems to be the only factor to affect the postoperative IOP higher than 22 mmHg.

Keywords: Glaucoma, Intraocular Pressure, Phacoemulsification.

Received: 12.07.2020, Accepted: 27.08.2020. Ad-din Medical Journal. 2021; 2 (1): 04-08

Introduction

Intraocular pressure (IOP) may rise even after uncomplicated cataract surgery which might need intervention^{1,2}. The response in IOP to phacoemulsification is biphasic, with a transient immediate rise followed by a modest long-term decrease³⁻⁵. Postoperative IOP usually peaks 5-7 h after surgery and returns to normal levels in 1-3 days^{3,6,7}. Although transient, the elevated IOP can cause ocular pain, may increase the risk of sight threatening complications such as retinal vascular occlusion, progressive field loss in advanced glaucoma, and anterior ischemic optic neuropathy in susceptible patients^{8,9}. Several risk factors such as glaucoma, viscoelastic agent, and surgical procedure for postoperative IOP rise have been identified^{3,10}. Our aim in this study was to analyze the risk factors that might result in IOP rise following uneventful phacoemulsification.

Materials and Methods

We retrospectively evaluated the records of 812 eyes of 584 consecutive patients, who underwent uncomplicated clear corneal incision phacoemulsification surgery in our clinic between May 2014 and July 2020. There were 330 men and 254 women ranging between the age of 26 and 89 years (65.4 ± 9.8 years). All the surgical procedures were performed by two surgeons (RAY and SS). All the patients had peribulbar anesthesiaand uncomplicated phacoemulsification surgery via 2.80 mm corneal incision placed superiorly. Single temporal side port incisions were made to allow access of a second instrument. Dispersive viscoelastic was used to fill the anterior chamber. Continuous curvilinear capsulorhexis was performed routinely. In mature cataracts before performing capsulorhexis, trypan blue was used to dye the capsule. During phacoemulsification, a stop and chop or phaco-chop technique was used. The capsule was filled with a cohesive viscoelastic and a foldable posterior chamber intraocular lens was

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implanted in the capsular bag. Viscoelastic was thoroughly removed via irrigation/aspiration (I/A), and a rock and roll technique was used for the removal of viscolelastic behind the IOL.

The preoperative as well as postoperative first day, first week, and first month visit IOP values were measured by non-contact tonometer and recorded. IOP was grouped as normal (≤22 mmHg) and high (≥22 mmHg). All the glaucoma patients were primary open angle glaucoma. Patients that suffer from other types of glaucoma were excluded from the study. Patients who were receiving antiglaucomatous medication also continued to receive the same medication before and after surgery. None of the patients was given prophylactic medication before the surgery. Antiglaucoma drugs that incite more inflammation like prostaglandin analogs were stopped 2 weeks before surgery and an antiglaucoma drop that does not incite inflammation was prescribed. An antiglaucoma drug that does not incite inflammation was prescribed and continued for 1 month after surgery. In addition, acetazolamide was notgiven after the surgery.

All data were entered to SPSS software (Statistical Package for the Social Sciences, version 10.0, SPSS Inc, Chicago, IL, USA). and the changes in IOP were compared with paired Student's t-test. Data on prior history of glaucoma, pseudoexfoliation (PXF), incision site, anterior capsular staining, and surgeonwere recorded. The relation of these factors with postoperative high IOP at each visit (days 1, 7, and 30) were evaluated using multinomial regression analysis. The level of significance was set at <0.05.

Result

The mean preoperative IOP was 15.6 ± 4.3 mmHg (ranged from 7 to 36 mmHg). At day 1, the IOP increased significantly to 19.7 ± 9.0 mmHg (ranged between 6 and 58 mmHg; P <0.001, 95% CI -4.68 to -3.52). The mean IOP was 12.7 ± 4.5 mmHg (ranged between 6 and 37 mmHg) at day 7, and 12.8 ± 3.7 mmHg (ranged between 6 and 34) at

day 30. Compared to the preoperative values, days 7 and 30 IOP values were significantly low (P < 0.001, 95% CI 2.54–3.17 for day 7, and 2.47–3.03 for day 30). At day 1, the high IOP was detected in 249 (30.7%) eyes with a mean of 30.7 ± 7.5 mmHg. At day 7, the number of patientswith high IOP decreased to 26 eyes (8.8%). Similarly, at day 30 only 16 (1.2%) eyes had the high IOP. The incidences of high IOP with possible associated factors are shown on Table-I. Diabetes was present in 100 eyes (12.3%), PXF was observed in 77 eyes (9.5%), and glaucoma in 60 eyes (7.4%).

Table I: The distribution of IOP values as normal (≤22 mmHg) or high (>22 mmHg) at each visit (day 1, day 7, and day 30) according to the investigated factors such as surgeon, pseudoexfoliation (PXF), glaucoma, PXF and glaucoma, diabetes(DM), incision [so: Superior oblique, t: Temporal], trypan dye [1: Present; 2: Absent]

	IOP									
		Day 1		Day 2		Day 30				
		≤22	≥22	р	≤22	≥22	р	≤22	≥22	р
Surgeon	RAS	342	155	0.374	478	19	0.187	490	07	0.360
	SS	221	94		308	07		309	06	
PFX	1	514	221	0.660	711	24	0.633	723	12	0.372
	2	49	28		75	02		76	01	
Glaucoma	1	533	219	0.004	733	19	0.001	745	07	<0.001
	2	30	30		53	07		54	06	
PFX&Glaucoma	1	552	239	0.491	766	25	0.435	779	12	0.702
	2	11	10		20	01		20	01	
DM	1	493	219	0.783	688	24	0.321	700	12	0.477
	2	70	30		98	02		99	01	
Incision	SUP	242	93	0.088	324	11	0.685	330	05	0.487
	INF	321	156		462	15		469	08	
Trypan	1	540	229	0.053	746	23	0.257	760	09	0.098
	2	20	20		40	03		41	02	

The relation of associated factors with high IOP was evaluated using multinominal regression analysis. P = probability value.

In 477 eyes (58.7%), Trypan blue was used in 43eyes (5.3%.). With the multinomial regression analysis, none of the factors. was related to the high IOP postoperatively (P < 0.05), except glaucoma. Glaucoma was the only factor related

to high IOP values during the postoperative period (P = 0.004 at day 1, 0.001 at day 7, and < 0.001 at day 30). Of the 60 glaucomatous eyes, all were receiving the glaucoma medication. The IOP was high in 30 eyes (51.7%) in the first day, in 7 eyes (12.1%) in the first week, and in 6 (10.3%) patients in the first month.

Discussion

Transient IOP rise may be observed in the early postoperative period after uneventful cataract surgery ¹¹⁻¹³. In this study, we retrospectively evaluated the risk factors that might affect the IOP rise following uncomplicated phacoemulsification surgery. The IOP measurements were recorded at the postoperative days 1, 7, and 30. We accepted 22 mmHg as the cut-off point for high IOP. Thirty percent of all eyes had high IOP at day 1. Among all the factors such as surgeon, diabetes, PXF, glaucoma, incision site, and trypan blue use, the only factor related to postoperative high IOP values was glaucoma ($P \le 0.001$).

Our results indicate that short-term postoperative IOP was higher in eyes with primary open angle glaucoma than in nonglaucomatous eyes (P ≤ 0.001). In another study, glaucoma was reported as a risk factor for pressure rise after phacoemulsification and the incidence of substantial elevation in IOP was similar between the eyes with primary open angle glaucoma and those with pseudoexfoliative glaucoma¹⁴. Tong and Miller retrospectively investigated the preoperative and postoperative IOP measurements of 385 consecutiveeyes having uneventful phacoemulsification¹⁵. Patients with preoperative diagnosis of glaucoma had significantly higher IOP at postoperative first week. Yasutaniet al¹⁴. also mentioned that a substantial increase in IOP occurred in approximately 13% of the eyes with open angle glaucoma 1 day after phacoemulsification surgery.

In our study, PXF with normal IOP was not significantly correlated with high IOP even in the early postoperative period after uneventful phacoemulsification. Also in two studies, it has been reported

that there was no significant difference in the IOP after phacoemulsification in eyes with and without PXF^{16,17}. On the other hand, a long-term lasting reduction in mean IOP occurred in PXF eyes¹⁸⁻²¹. Damji et al.²¹ demonstrated that in the 2 year follow-up, the patients with PXF have a greater IOP lowering effect following phacoemulsification thanthose without, and the authors concluded that this effect was correlated with the volume of irrigating fluid utilized at the time of surgery. In addition to these results, Cimetta and Cimetta¹⁸ operated a group of 39 open angle, nonglaucomatous eyes with cataract and PXF syndrome and a control group of open angle, nonglaucomatous eyes with cataract, using a standard phaco technique along with bimanual anterior capsule PXF material aspiration. Phacoemulsification with anterior capsule PXF material aspiration significantly reduced the mean diurnal IOP in the PXF group lasting one year postoperatively. In another retrospective comparative study, 1122 eyes with PXF, 240 with glaucoma and 882 without glaucoma underwent uneventful phacoemulsification. A long-term reduction in mean IOP occurred in PXF eyes with or without glaucoma¹⁹. However, IOP rise in the early postoperative period was noted after phacoemulsification in nonglaucomatous eyes with PXF and IOP control was advised²²⁻²⁴. This early IOP rise may be due to severe inflammation after cataract surgery in eyes with PXF due to pathological iris vessels with an increased permeability for protein. In addition, there were eyes with an elevated IOP without inflammation in the PXF group in whichthe mechanism of IOP rise could not be identified²³. However, in this study, with or without glaucoma, we did not observeany relation of PXF to high IOP.Anterior capsular staining with trypan blue in our studywas not associated with high IOP at any postoperative visit(P > 0.05). In a preliminary study, 25 eyes of 25 patients with aunilateral mature or hypermature cataract, trypan blue dye wasused to stain the anterior capsule. Adverse reactions related to the dye such

as raised IOP were not observed in the immediatepostoperative period or at the end of the mean follow-up of 3months²⁵. In a comparative study, phacoemulsification of 82patients who had white mature cataract in one eye and senilecataract in the other were operated. Trypan blue dye wasused in the white mature cataract and not used in the felloweye. Postoperative IOP was not significantly different in thetwo groups²⁶. In a previous study¹⁵, wound construction, an esthesia type, the eye operated on, patient age, and sexdid not significantly influence the postoperative pressurechange. Similarly, in this study, there was no correlationbetween history of diabetes, surgeon, and incision site (P >0.05). Surgeon's experience was reported as an importantfactor for the postoperative IOP rise. The mean pressure risein eyes operated by experienced surgeons was about half thepressure rise in eyes operated by beginners, as beginners often perform intraocular surgery in a more traumatizing mannerthan experienced surgeons. In our study, there was no relationbetween high IOP and surgeon. This was most probably related to the similar experience of two surgeons in present series. As for the incision site, a study that compares temporalsclerocorneal or clear corneal incision, postoperative IOP wassignificantly higher in the sclerocorneal tunnel group than in the clear corneal incision group^{27,28}. In our group, all surgeries were performed via clear corneal incision, so we are unable to compare with different types of incision. In conclusion, our study demonstrated that following uneventful phacoemulsification, the diagnosis of glaucoma was the only risk factor for IOP higher than 22 mmHg. On the other hand, according to our results, PXF was not a risk factor for high IOP. We believe that patients who have glaucoma are at risk, and should be monitored closely for high IOP following phacoemulsification surgery.

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Original Article

Study of Morphological Changes in Placenta Associated with Intrauterine Growth Retardation

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Abstract:

Background: Intrauterine growth retardation (IUGR) or "fetal growth restriction" is a term applied to a condition of poor growth of the fetus in utero. Intrauterine growth retardation (IUGR) is considered the most common cause of low birth weight. It is one of the important cause of perinatal morbidity and mortality. The placenta shows functional and structural changes in IUGR. Morphological examination of the placentas from IUGR fetuses can supplement clinical knowledge of the causes of IUGR. The gross findings of placentas from IUGR pregnancies include a reduced placental weight, a thin umbilical cord, eccentric insertion of cord and parenchymal loss. Objective: The aim of this study was to identify the morphological changes of placenta in IUGR. Methods: This is a descriptive cross sectional study which was carried out at the Department of Pathology, Dhaka Medical College, during the period of March, 2017 to February, 2019. A total 57 patients who were clinically diagnosed as term pregnancy with intrauterine growth retardation and delivered by Caesarean section without induction of labor with the aim to minimize the potential effects of labor itself on placental morphology included in this study. The placentas from all of these patients were collected and fixed in formalin. Patient's demographic data were collected from patient's file and requisition forms. Statistical analysis was done using SPSS(version 19).Result: In this study most of the IUGR babies were delivered from first (24/42.1%) and second pregnancy (20/35.1%). The mean placental weight was 348.5±44.7gm and mean diameter was 14.63±2.05cm. The umbilical cord diameter was 1.46±0.36cm and marginal insertion was 54.4%. Conclusion: This study showed that morphological changes present in the placenta of IUGR newborn.

Keywords: Gestational Age, IUGR, Placental Changes, Umbilical Cord Insertion.

Received: 22.08.2020, Accepted: 17.09.2020.

Ad-din Medical Journal. 2021; 2 (1): 09-13

Introduction

Intrauterine growth retardation (IUGR) is defined as having a weight at or below the 10th percentile for the expected birth weight at a given gestational age¹. The prevalence of IUGR is reported to be 3-10% of live newborns in developed countries and 15-20% of newborns in developing countries². Known causes of IUGR can be traced in up to 40% of cases, these are maternal diseases, fetal or placental factors and the remainder of IUGR cases are idiopathic in origin. The maternal diseases are hypertension, cardiac disease, pulmonary or renal disease, anemia and connective tissue disease.

Among these maternal hypertension related diseases like preeclampsia, eclampsia and pregnancy induced hypertension are the most important factors of IUGR. Fetal factors include chromosomal abnormalities, ventral wall defect, genitourinary defects and intrauterine infection. Morphological examination of the placentas from IUGR fetuses can supplement clinical knowledge of the cause of IUGR^{3,4}.

The placenta is the mirror of maternal and fetal status; it reflects the changes occur in IUGR due to maternal hypertension, anemia, diabetes etc. and it also reflects fetal causes like intrauterine infection. As placentas are rarely examined, there is a little knowledge regarding the benefits of routine placental examination based on pregnancy outcome and risk assessment for long term neurodevelopmental sequelae. The working group of College of American pathologist had laid some indications for the examination of placenta based on the patient care and risk management^{5,6}.

An impairment in the invasion of fetal trophoblastic cells into the maternal decidua has been hypoth-

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esized as a cause of placental insufficiency and this leads to IUGR. The gross findings of placenta of IUGR pregnancies include a reduced placental weight, placental parenchymal loss, a thin umbilical cord and marginal insertion of cord ^{7,8}.

Though IUGR fetuses are more frequently associated with morphologically and histologically abnormal placentas, it could not be conclusively decided whether these abnormalities are responsible for the intrauterine growth restriction or not. The study of placental pathology can greatly contribute to a better understanding of a complex subject such as IUGR⁹.

Material and Method

This descriptive cross sectional study was carried out at the Department of Pathology, Dhaka Medical College, during the period of March, 2017 to February, 2019.

Prior to commencement of this study, a research protocol was submitted to Ethical Review Committee(ERC) of Dhaka Medical College (DMC) and it was approved(Memo No.MEU-DMC/ ECC/ 2017/166(R), Date 29/08/2017).

A total fifty seven cases who were clinically diagnosed as term pregnancy with intrauterine growth retardation and delivered by Caesarean section without induction of labor included in this study. Placentas were collected and fixed in formalin. After fixation gross examination was done. Statistical analysis was done using SPSS (version 19). Frequency of changes were calculated in percentage (%).

Result

A total of 57 placentas were collected from the patients clinically diagnosed as term pregnancy with intrauterine growth retardation and delivered by Caesarean section.

The mean age of the mothers were 25.02±4.68 years with age ranges from 17 to 38 years. Highest number of cases (47.4%) were in the 20-24 years of age. Most of the IUGR babies were delivered from first (24/42.1%) and second pregnancy (20/35.1%). Regarding the co-morbidities, 79% mothers had known co-morbidities like eclampsia, preeclamp-

sia, bronchial asthma, pregnancy induced hypertension, hypothyroidism, rheumatoid arthritis, Hb E disease and anemia. The common co-morbidities were eclampsia (29.8%) and preeclampsia (26.3%). In 21.1% cases there were no known co-morbidity. If hypertension related co-morbidity is considered (i.e. eclampsia, pre-eclampsia and pregnancy induced hypertension) it was the most common co-morbidity (63.15%).

The mean weight of baby was 2.04±0.23 kg ranged between 1.4 to 2.5 kg. Twenty nine (50.9%) babies had their weight between 2.0 to 2.5 kg (Table I). The mean baby weight in hypertensive and non-hypertensive mothers were 1.99 kg and 2.14 kg respectively. There was significant (p<0.05) difference in mean baby weight among the hypertensive and non-hypertensive mothers.

On gross examination of the placenta, the mean placental weight was 353.94±49.5 gm (Table II). The mean placental diameter was 14.63±2.05 cm. They were arranged in 4 groups; 61.4% (35) placental diameter were in between 13-16 cm (Table III).

The mean placental weight was 337.7 gm in hypertensive mothers and 364.28 gm in nonhypertensive mothers. The mean baby weight in hypertensive and non-hypertensive mothers were 1.99 kg and 2.14 kg respectively. There were significant (p<0.05) difference between mean placental weight and mean baby weight among the hypertensive and non-hypertensive mothers (Table IV).

The mean diameter of the umbilical cord was 1.46±0.36 cm. The diameter ranged between 0.7 cm to 2.2 cm (Table V). The marginal cord insertion was 54.4% and central cord insertion was 45.6% (Fig 1).

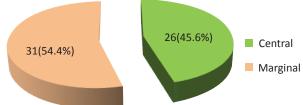


Figure 1: Pie chart showing distribution of the site of umbilical cord insertion (n=57).

Table I: Distribution of birth weight of the babies (n=57)

Weight in kg	Number of subject (%)
1.0 - 1.5	3(5.3)
1.5 – 2.0	25(43.9)
2.0 - 2.5	29(50.9)
Total	57(100)
Mean ± SD	2.04 ± 0.23
Range	1.4 – 2.5

SD=standard deviation.

Table II: Distribution of the weight of placenta (n=57).

Weight of placenta in grams	Number of placenta n (%)		
250 – 300	7(12.3)		
300 – 350	12(21.1)		
350 – 400	25(43.9)		
400 – 450	12(21.1)		
450 – 500	1(1.8)		
Total	57		
Mean ± SD	348.50 ± 44.7		
Range	250 – 450		

SD=standard deviation.

Table III: Distribution of the sample according to the placental diameter (n=57).

Placental Diameter in centimeter	Number of placenta (%)
10 – 13	6(10.5)
13 – 16	35(61.4)

Weight in kg	Number of subject (%)
16 – 19	15(26.3)
19 – 22	1(1.8)
Total	57(100)
Mean ± SD	14.63 ± 2.05
Range	10 – 20

SD=standard deviation.

Table IV: Distribution of the mean placental weight and mean baby weight in hypertensive and non-hypertensive mothers (n=57).

Mean p	Mean baby weight(kg)	
Hypertensive mother	337.7±39.5	1.99±0.22
Non Hypertensive mother	364.28±49.5	2.14±0.21
P value	<0.05 ^s	<0.05 ^s

Table V: Distribution of the study subjects according to umbilical cord diameter (n=57)

Umbilical cord diameter in centimeter	Number n(%)
0.5 – 1.0	9(15.8)
1.0 – 1.5	28(49.1)
1.5 – 2.0	17(29.8)
2.0-2.5	3(5.3)
Mean ± SD	1.46±0.36
Range	0.7 – 2.2

SD=standard deviation.

Discussion

Intrauterine growth retardation (IUGR) is related to a variety of clinicopathological factors including maternal, uterine and fetal factors. Many recent studies provide good evidence for the occurrence of distinctive morphological and histological abnormalities in the placentas complicated by IUGR^{10,11}. In this study the mean age of the mother was 25.02±4.68 years with age ranges from 17 to 38 years. Among them 79% were in the 20 to 29 years age group. According to Singh, Pemmaraju and Nema¹² the age ranges from 20 to 35 years and the mean age was 26.6 years. In another study revealed 72% cases were between 21 to 30 years¹³. In the present study most of the IUGR babies were delivered from primigravida (42.1%). In a study by Sheela et al¹⁴ observed most IUGR cases were associated with primigravida. In another study 33% of the mother were primigravida⁹.

In the current study 79% mothers had known co-morbidities. The co-morbidities were eclampsia (29.8%), preeclampsia (26.3%), bronchial asthma (5.3%), pregnancy induced hypertension(7%), hypothyroidism(3.5%), rheumatoid arthritis (1.7%), Hb E disease(1.7%), anemia (1.7%) and 21.1% cases had no known co-morbidity. In another study revealed the following co-morbidity - PET & eclampsia (18%), hypertension (16%), anemia (14%), antepartum haemorrhage (6%), urinary tract infection (2%) and idiopathic (34%)¹³. In another study by Gupta and Khajuria¹⁵ found two major co-morbidities i.e. PIH (37%) and anemia (40%). In their study 20% cases were idiopathic.

In this study most common co-morbidity was related to hypertension (63.15%). The mean placental weight 337.7 gm and the mean baby weight 1.99 kg in hypertensive mothers were significantly lower than non-hypertensive mothers where the mean placental weight and mean baby weight were 364.28 gm and 2.14 kg respectively(p<0.05). Other study found the mean placental weight 306±54 gm and the mean baby weight 1.8±.43 kg in hypertensive mothers were significantly lower than non-hypertensive mothers

where the mean placental weight and mean baby weight were 317 ± 77 gm and $2.17\pm.38$ kg respectively(p<0.05)¹⁶.

This study revealed mean weight of baby was 2.04±0.23 kg ranged between 1.4 to 2.5 kg. Among them 29 (50.9%) babies had their weight between 2.0 to 2.5 kg. Other study revealed similar findings¹².

On gross examination of the placenta, this study revealed mean placental weight 353.94±49.5 gm. Other studies revealed similar findings^{12,17}. We found mean placental diameter 14.63±2.05 cm and 61.4% (35) placental diameter were in between 13-16 cm. Oliveira, Xavier and Lana⁹ found placental diameter in IUGR <18 cm which show concordance with this study.

In this study it was found that the mean diameter of the umbilical cord was 1.46 ± 0.36 cm. The diameter ranged between 0.7cm to 2.2cm. Similar result was observed in another study¹⁸.

This study revealed marginal cord insertion was 54.4% and central cord insertion was 45.6%. Singh, Pemmaraju and Nema¹² showed umbilical cord insertion was marginal 63.33% and central 36.67%. Nigam et al¹⁷ found 66.6% eccentric attachment of the cord.

Conclusion

This study showed the placenta of IUGR newborn was smaller, umbilical cord was thin and inserted eccentrically in more than half of the cases. Therefore, all pregnancies diagnosed with IUGR antenatally must be suspected or ruled out for etiology of placental changes unless proved otherwise. Such IUGR fetuses must be considered at risk for poor placental circulation and hypoxia along with compromised nutrition. The morphological findings of a placenta are more objective and seem to offer a good way to get proper information about IUGR.

Conflict of interests

There is no conflict of interests in this study.

Acknowledgement

We are greatly thankful to Prof. Md. Rezaul Karim Dewan, Head of the Department of Pathology, Dhaka Medical College and Prof. Salma Rouf, Head of the Department of Obstetrics and Gynaecology, Dhaka Medical College for continuous support during this study. We are also grateful to all the stuffs of Department of Pathology and the operation room personnel of the Department of Obstetrics and Gynaecology.

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Original Article

Assessment of Undergraduate Medical Students in the Department of Physiology using Multiple Choice Question and Short Answer Question

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Abstract:

Background: Assessment is a powerful educational tool with precise framework of medical education by formulating good quality of Multiple Choice Questions (MCQ) and Short Answer Question (SAQ). Difficulty Index (DIF-I) and Discrimination Index (DI) are used to determine the essence of the MCQ and SAQ of written assessment method. Objective: To evaluate the assessment levels of medical students with correlation between MCQ and SAQ used in Physiology examination. Methods: This cross sectional study was conducted on 150 First year MBBS students of Enam Medical College, Savar, Dhaka, who appeared in 1st, 2nd and 3rdterm final internal examination of Physiology from January 2019 to February 2020.Difficulty Index (DIF- I) and Discrimination Index (DI) of a total 60 MCQand 54 SAQ were analyzed. Results:After data analysisamong internal examination, maximum 70% MCQmarks of DIF-I within the appropriate level and 5% items were difficult. Whereas DI of majority MCQ marks 65% was excellent and 5% of the items were poor. Again, data analysis on SAQfound 68.01% recall and 36.67% understanding types but poor percentage of problem based types of questions. DI of SAQ found 24% excellent and 1.9% was poor. There was significantly positive correlation of MCQ with SAQ. Data were statistically analyzed by Independent sample 't' test and Pearson's correlation coefficients test using SPSS version 26. Conclusion: In this study, observed that there is no single best method for assessing cognitive levels of medical students. So. two important written format (MCQ & SAQ) must be interrelated for better outcomes.

Key words: Discrimination Index, MCQ, SAQ

Received: 12.08.2020, Accepted: 13.10.2020. Ad-din Medical Journal. 2021; 2 (1): 14-21

Introduction

Medical education has significantly changed with high quality assurance over the past few decades. The most important feature of an updated academic curriculum is assessment through written, practical and oral. 2,3 Learning tool helps to measure the progress of training for success of goal. 4

Assessment cycle related with interpretation of examination scores withquestion creation.^{5,6} From 2012 revised curriculum, in Bangladesh under the Dhaka University, MBBS (Bachelor of Medicine and Bachelor of Surgery) course includes Phase-I, II, III & IV. Phase-I subjects for

undergraduate medical students includes Physiology, Anatomy and Biochemistry. In Physiology subject, medical students are assessed by summative and formative. ¹⁻³ Again formative assessments that include item examination, card final and term final those are shape of development for the quality of education. ⁴

For assessments, practical or written examinations can assess the student's cognition, skill performance and attitude. For the undergraduate students, cognition can be assessed in two different written formats: selected response format (SRF) and free response format (FRF) besidesskill performance and attitude are assessed in the practical (clinical) examination. SRF includes multiple choice questions (MCQs) and extended matching questions. FRF includes short answer questions (SAQs), short essay questions (SEQs), Modified essay question (MEQ), problem based question (PBQ) and long answer questions. ⁵⁻⁹

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Most common written assessment methods include multiple choice questions (MCQs) and short answer questions (SAQs). There are some group of researcher, who gives more emphasis on MCQ,^{3,5} other researchers also found SAQ is more reliable and superior. 12,14 So, it is important to assess the correlation between the two different formats (MCQ & SAQ) of written assessments.¹⁰ Medical education has been found to play a vital role in nation building by the review and formulation of curriculum component is an ongoing process in several medicalcolleges all over the world.²²In Bangladesh, medical education is centrally controlled by the Government (govt.) and run a unique undergraduate curriculum throughout the country in both govt. and non govt. sectors.^{2,4}Learning process must be assessed in multiple modes and contexts. Written examination is traditionally and widely accepted an integral part of the evaluation of the undergraduate medical science. 15,17

MCQ become more objective and easily scored both manually and electronically and also assess the problem solving skill ability. MCQ have the disadvantage that higher chances of student guessing that lead to falsely higher scores than other written methods. MCQ is one of the tool that consists of stem and 5 true or false responses. True or correct answer to a question is called key and false or incorrect answer is called distracters. Ut depends mainly sufficient and appropriate balance between key and distracters. Students select the correct answers by circling the associated number or letter, or filling in the associated circle on the machine-readable response sheet. 20

Another written assessment method, SAQ scoring is subjective and more time consuming than MCQ. SAQ are prone to error and risks of bias. ^{14,15} Also, most of the studentshandwritten responses are not clear and unreadable. ¹¹Although, this format of assessment reflects student's interpretive skills and provides flexibility in their responses. ¹⁶

Furthermore, it does not suitable to assess problem solving skills. 13,18

According to curriculum of 2002 and revised from 2012, Physiology SAQ (Paper- I and Paper- II) of First Professional MBBS examination held twice (regular and supplementary) in a year under the Dhaka University. In each paper there are Group -A and Group -B, each group contains 35 marks. Each question having 05 marks where students answer any 07 questions from each group out of 08 questions. 1,2 Scores of internal examinations (1st, 2nd and 3rd term final) by written assessment format (MCQ and SAQ) of Physiology department that helps to make 10% mark for formative assessment.

Several studies have established to explore a strong correlation between MCQ and SAQ to determine the adequacy of knowledge with standardization.¹⁰ This results can be applied to the practical improvement of assessment practices.¹² By Difficulty Index (DIF-I) and Discrimination Index (DI) of written format is a way of good assessment communication between students and teachers.¹⁴

Choosing the best method for assessment in terms of reliability and validity remains a matter of debate. So, now-a-days integration of teaching method ismost popular method worldwide. It means bridging connections between academic knowledge and practical.¹⁹

Currently, no single assessment method is perfect and no single test can competence for the performance of a medical knowledge. For a reliable and valid assessment, multiple methods should be employed.

Materials and Methods

This cross sectional study was carried out in the Physiology department, Enam Medical College, Savar, Dhaka. The data were collected from the 1st, 2nd and 3rdterm final Physiology written (MCQ and SAQ)internal examinations over a 1year period. A total 150 1st year bothBengalis

and Foreigners Phase-I MBBS students were appeared.

In each term final examination, MCQ paper includes 20 multiple true or false options. Each MCQ have a single stem with 5 responses or options. Total 20 mark was allotted for 20 MCQs. 0.2 marks was allocated for each correct answer and zero (0) marks for each incorrect answer so, score range was 0-1.Total 60 MCQs of all term final examinationswere analyzed. There was no negative marking and the passed marks were 12 (60%).

A total 54 SAQ papers of all term final examinations were included while in each paper includes Group- A (40 marks) and Group- B (40 marks). In each group there were 09 questions with or without multiple segments to assess cognitive levels of medical students. Each question carried 05 marks and students answered any 08 questions from each group and the passed marks were 48 (60%). According to curriculum, every segment of the questions in a paper was categorized as 60% recall, 30% understanding and 10% problem based learning (PBL)types.^{22,23}

The appeared students were considered as high achievers (H) and low achievers (L) group. Discrimination index of MCQ and SAQ and difficulty index for each MCQ item were analyzed. For statistical analysis, Independent sample't' test and Pearson's correlation coefficient test was performed by using SPSS version -26 & p \leq 0.05 was accepted as level of significance.

Difficulty Index (DIF-I):

It is the percentage of students in high and low achievers group who answered the item correctly and ranges between 0% and 100%, where the percentage refers to the percentage of students from the total of the lower and upper groups. 5,7 The following formula was used to calculate the DIF-I = H + L × 100/N.

Discrimination Index (DI):

DI is the ability or degree of an item to differentiate ordiscriminates between students of high and low achievement and ranges between 0 and 1.Index of 0.40 and above is regarded as very good items, 0.30 to 0.39 is reasonably good, 0.20 to 0.29 needs improvement and 0.19 or below is to be revised .5,7It was calculated by using the formula: DI = $2 \times (H-L)/N$.

Here, H = number of students answering the item correctly in the high achieving group, L = number of students answering the item correctly in the low achieving group, N = total number of students in the two groups.

Result

Total 60 MCQs were analyzed where each question contains highest value one (1) and lowest value zero (0). After statistical analysis, Mean score of 1st, 2nd and 3rd term was 16.39±1.75, 16.30±2.21 and 16.73±1.62 respectively. Difficulty Index (DIF-I) of maximum 12(60%) items were in the acceptable range (30-70%), only 2 (10%) item was difficult in 1st term final, DIF-I of maximum 14(70%) items were in the acceptable range (30-70%), only 1 (5%) item was difficult in 2nd term final and DIF-I of maximum 10 (50%) items were in the acceptable range (30-70%), only 3 (15%) item was difficult in 3rd term final internal examination. Interpretation of the results of DIF of MCQ was shown in Table-I.

Table I: Difficulty Index (DIF-I) ofMCQs of Physiology internal examination (n=60)

Internal	Number (% of frequency of MCQ			
examination	Easy	Medium	Difficult	Mean ± SD
1st term final (20 MCQ)	6 (30%)	12 (60%)	2(10%)	16.39 ± 1.75
2nd term final (20 MCQ)	5 (25%)	14 (70%)	1 (5%)	16.30± 2.21
3rd term final (20 MCQ)	7 (35%)	10 (50%)	3 (15%)	16.73± 1.62
Cut off point (%)	>70	30-70	<30	51.64±18.71

Discrimination Index (DI) of majority of the MCQ items found, 13 (65%) of 3rd term final was excellent (≥0.35), 9 (45%) of 2nd term final was average (0.20-0.34) and 1 (5%) of 1st term final was poor (<0.20)shown in table-II.

Table II: Discrimination Index (DI) of MCQs of Physiology internal examination (n=60)

Interpre-	Intern (%	Cutoff		
tation	1st term (20)	2nd term (20)	3rd term (20)	point (%)
Excellent	11 (55%)	9(45%)	13 (65%)	≥0.35
Average/ Good	8(40%)	9 (45%)	5(25%)	0.20-0.34
Poor	1(5%)	2 (10%)	2(10%)	<0.20

A total of 54 SAQ papers of Physiology internal examinations were included for analysis. Table-III shows that the mean percentage of scores of SAQ, 65.48%, 33.05% and 1.46% were allocated for recall, understanding and problem based type of questions respectively. The percentage of marks allocated for recall was significantly highest in 3rd term (68.01%) and lowest in 1st term (63.33%) examination. The percentage of marks allocated for understanding was significantly highest in 1st term (36.67%) and lowest in 3rd term(30.01%) examination. No mark was allocated for problem based type of SAQ in 1st term final. Therefore, significantly highest scores of SAQ 2.41% in 2nd term and 1.98% in 3rd term was allocated for problem based questions.

Table III: Mean percentage of scores of SAQ of undergraduate Physiology internal examination (n=54)

Internal	Scores distribution of types of SAQs			
examination	Recall (%)	Understanding (%)	Problem based (%)	
1st term final	63.33	63.33	63.33	

Internal	Scores distribution of types of SAQs			
examination	Recall (%)	Understanding (%)	Problem based (%)	
2nd term final	65.11	32.48	2.41	
3rd term final	68.01	30.01	1.98	
Mean	65.48	33.05	1.46	

Frequency distribution of SAQ majority found, 13 (24%) 3rd term final was excellent, 6(11.1%) 1stterm final was average and1 (1.9%) of 2nd and 3rdterm final was poor respectivelyshown in table-IV

Table IV: Frequency distribution of SAQ of undergraduate Physiology internal examination (n=54)

Interpretation	Number (% frequency of the SAQ)			
interpretation	1st term final 18(33.33%)	2nd term final 18(33.33%)	3rd term final 18(33.33%)	
Excellent	10 (18.5%)	12(22.2%)	13(24%)	
Average/Good	6 (11.1%)	5(9.2%)	4(7.4%)	
Poor	2 (3.7%)	1(1.9%)	1(1.9%)	

Internal assessment marks showed a positive correlation with MCQ and SAQ written assessment method which was highly significant that are found in Table -V.

Table V: Correlation of MCQ with SAQ of Physiology internal examination

Internal examination	Correlation of MCQ and SAQ		
internal examination	r value	p value	
1st term final	0.712	<0.001***	
2nd term final	0.341	<0.001***	
3rd term final	0.012	<0.001***	

Statistical analysis was done by Pearson's correlation coefficient test (r)

***: Significant

Discussion:

Assessment methods in medical education used to test the knowledge acquired and the ability to apply such knowledge¹⁰. A study conducted on 100 MBBS students of medicine for 100 MCQs, 48.90 ± 13.72 mean Difficulty Index (DIF-I) was reported by researcher²⁴. In this present studyamong all term final examination, majority (70%) of MCQ were in the acceptable range (30-70%) and only one (5%) item was difficult (< 30%).To discriminate between skilled and unskilled examinees, Discrimination Index (DI) is another important tool of MCQ analysis. DI of MCQ of internal examination, majority of the MCQ 13 (65%) was excellent (≥0.35), 9 (45%) was average (0.20-0.34) and 1 (5%) was poor (<0.20). A study by one author found Singh et al. (2012)after analysis of 20 MCQs reported more than one third (30%) of the items with DI < 0.2, and half 10 (50%) of the test items with DI > 0.35, results compared to our present study²⁵.

In this study, mean percentage of scores of SAQ of internal examination 68.01% and 36.67%were allocated for recall and understanding types of questions respectively. No mark was allocated for problem based type of SAQ in 1st term final. Therefore, significantly highest scores of SAQ 2.41% in 2nd term and 1.98% in 3rd term was allocated for problem based questions. Frequency distribution of SAQ of internal examination majority found, 13 (24%) was excellent, 6(11.1%) was average and1 (1.9%) was poor. Internal assessment marks showed a positive correlation with MCQ and SAQ written assessment method which was highly significant (p value <0.001).

The percentage of marks allocated for recall and understanding type of questions follow the curriculum directed weightage but problem based questions not follow the direction.In this new curriculum, the written examination format was modified to SAQ and MCQ along with 10% mark added for formative assessment.^{1,2} After success-

fully complete internal assessment 1st, 2nd& 3rd term) medical students have been appeared in 1stProfessional MBBS Examination.⁴

Written examination consists of two papers and in each paper 70% marks were allocated for SAQ and 20% marks for MCQ. To assess different cognitive domains of students in physiology, while constructing questions for SAQ, the curriculum has recommended, 70% marks for recall, 20% for understanding and 10% for problem based learning (PBL) types of questions. This similar evidences were found in this study also observed by other researchers. ¹⁻⁴

Several studies found that interpreting tools of assessment related with comparison and correlation. The author stated that a total of 30 SSAQs (structured short answer questions) and 100 MCQs of five items were analyzed. The difficulty index of MCQ and SSAQ was 0.36 and 0.38, respectively. SSAQ showed higher discrimination index (0.46-very good item) than MCQ (0.29marginal item), SSAQ a better tool to discriminate poor and good students than MCQ.7There are similar evidences observed by other researchers that awell-constructed MCQ is superior in terms of the higher cognitive skills of medical students.3,13 Moreover, when combined assessment tools are analyzed, found MCQ were the best examination tools to distinguish poor from medium and excellent students. These findings also similar in this present study. 5,8

The main drawback of SAQ type question is that it is not easily computerized for assessing a large number of medical students. This study reported by different investigators, though difficulty index of SAQ and MCQ are similar, SAQ was a better tool. So, essential task of medical colleges take initiative to develop guidelines on setting up standard questions on basis of learning needs. ^{12,15} Another study found that the internal assessment marks showed a positive correlation with marks obtained in final assessment which was statistically (p<0.01) highly significant.⁹

The formative or internal assessment has multiple benefits. Its continuous nature throughout course has the potential to drive the students learning in the right way over the time.4Our well designed step by step assessment system that provides timely feedback to students could have contributed to better performance in finals assessment.^{6,9}

Sample size of the present study was small. However, further research can be done with a larger sample size. It is concluded from the present study that majority of the test items were within the recommended values.

Conclusion

In this study, it is concluded that there is a positive significant correlation between performance of students in internal assessment through written format (MCQ and SAQ). This marks in internal assessment are related to better marks in 1st professional MBBS examination.

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Review Article

Linezolid: A Hope Against Gram Positive Bacteria

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Abstract:

Linezolid is an oxazolidinone antimicrobial agent which inhibit protein synthesis by blocking the formation of the 70S ribosomal initiation complex. Linezolid has almost 100% bioavailability after oral administration and the safety and tolerability of this drug are excellent. It has been approved for the treatment of infections caused by vancomycin-resistant Enterococcus faecium (VRE), methicillin-resistant Staphylococcus (MRSA), hospital-acquired pneumonia caused by Staphylococcus aureus, complicated skin and skin structure infections and community acquired pneumonia caused by Streptococcus pneumoniae. Iinezolid resistance among these pathogens remains low, commonly < 1% although the prevalence of resistance is reported in many countries. Considering the potentiality of linezolid in the treatment of infections caused by Gram-positive bacteria, this review was undertaken.

Key words: Antibiotic, Bacteria, Gram positive, Linezolid, MRSA, VRE.

Received: 10.10.2020, Accepted: 17.11.2020 Ad-din Medical Journal. 2021; 2 (1): 21-24

Introduction:

Linezolid is the first member of oxazolidinone group which was introduced in 1978 for its effectiveness in controlling plant diseases. Six years later, their antibacterial characteristics, with significantly improved antibacterial properties relative to their progenitor compounds, were documented. Vancomycin and teicoplanin are traditionally considered the drugs of choice for treating complicated gram-positive infections but development of resistance against these drugs was create an impulse among the scientists to find out a new antibiotic. In addition, vancomycin cannot be given orally for its poor intestinal absorption. The emergence of VRE was initially recognized by CDC in the 1980s and they published a report after studying nosocomial

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infections due to VRE in ICU patients.^{2,3} On the contrast teicoplanin is a good option against gram positives but its toxicity requires continued observation of levels in parenteral administration.^{4,5} The increasing prevalence of MRSA has become a major therapeutic problem for the hospital infection which causes extra treatment costs and longer hospital staying.⁶ In the last 40 years, oxazolidinones have been considered as new class of antibiotics which are currently used in clinics specially linezolid⁷ and showing a new hope against gram positive organisms.

Mechanism of action of linezolid

Linezolid is a synthetic antibiotic which prevents the synthesis of bacterial protein via binding to rRNA on both the 30S and 50S ribosomal subunits.⁸ It inhibits the formation of initiation complex which can reduce the length of the developed peptide chains and decrease the rate of translation reaction.⁸ Linezolidhas a unique binding site of inhibition so development of cross-resistance to other protein synthesis inhibitors has not yet been decumented.⁹ Linezolid may also prevent the expression of virulence elements which cause minimum toxin production by the gram-positive pathogens.¹⁰

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Pharmacokinetics

Linezolid is well absorbed orally with a bioavailability of almost 100%.1,11The presence of food does not affect its absorption;5 therefore, the administration route of antibiotic can be changed from intravenous (IV) to oral in clinically stable patients.⁶ Co-administration with antacids like magnesium hydroxide and aluminum hydroxide have no effect on the oral absorption.¹² Plasma protein-binding level of the molecule is approximately 31%. The volume of distribution approximates 40-50 L, and the plasma half-life ranges from 3.4 to 7.4 h. The compound is metabolized to inactive forms including hydroxyethylglycine and aminoethoxy-acetic acid. 12 The clearance rate is 80±29 mL/min and renal tubular reabsorption may occur. A fraction of the dose may be excreted urine in active form.¹³

Mechanism of Resistance

Structures of linezolid showed that it binds to a deep cleft of 50S ribosomal subunit that is surrounded by 23S rRNA nucleotides. Mutation of 23S rRNA has been established as one of the linezolid resistance mechanisms. Moreover, mutations in particular regions of ribosomal proteins uL3 and uL4 are increasingly being associated with linezolid resistance, although these proteins are placed further away from the bound drug.

Clinical Uses and Spectrum of Linezolid

Linezolid has been approved for the treatment of the following conditions: 1. Hospital-acquired pneumonia caused by Staphylococcus aureus, including methicillin-susceptible (MSSA) and methicillin-resistant S. aureus (MRSA) strains or Streptococcuspneumoniae including multidrugresistant strains; 2. Vancomycinresistant Enterococcus faecium infections; 3. Complicated skin and skin structure infections (SSIs) including diabetic foot infections without concomitant osteomyelitis, caused by S. aureus (MSSA and MRSA), Streptococcus pyogenes, or Streptococcus agalactiae; 4. Uncomplicated SSSIs caused by MSSA or S. pyogenes; 5. Community-acquired pneumonia caused by S. pneumoniae, including cases with simultaneous bacteremia, or MSSA⁹ and;6. Pneumococcal meningitis caused by penicillin-resistant S. pneumoniae. ¹⁰

Adverse Effects

Adverse effects of linezolid are peripheral¹⁶ and ocular¹⁷ neuropathy, anemia that occurs by direct effect of linezolid on red cell population of bone marrow¹⁸, diarrhoea, thrombocytopenia¹⁹, hyperlactatemia¹⁸, nausea, headache^{20,21} hypoglycemia²² and reticulocytopenia.²³

Drug Interactions

Linezolid can be safely co-administered with aztreonam; however, there is no enough evidence about the interaction between linezolid and rifampin.¹⁷ Co-administration with ceftazidime, ciprofloxacin, meropenem, and gentamicinhave no adverse effect. Using linezolid with amphotericin B and azoles; aminogly cosides, antivirals, fluoroquinolones, or β-lactams do not affect their sufficiency. It therefore seems that linezolid can be used with other antimicrobials with interaction.Linezolid can cause life-threatening serotonin toxicity when combined with serotonin reuptake inhibitors. 24, 25

Conclusion

Linezolid is an excellent and promising new antibiotic for the treatment of resistant gram-positive pathogens having number of favourable characteristics which includes a spectrum of activity against MDR agents, good tissue penetration into

skin, bone, muscle, fat, alveolar cells, lung extracellular lining fluid, blister fluids and cerebrospinal fluid. It has near 100% bioavailability when administered by oral route and a unique mechanism of action involving inhibition of protein synthesis at a very early stagewhich avoids crossresistance with existing antimicrobials. So pharmacovigilance should be implemented to detect adverse effects in a broad scale as well as prescribers should be more couscous regarding its rationality and development of resistance as a public health practice.

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Case report

Absorbable Gelatine Sponge in the Conservative Surgical Management of Severe Uncontrolled Uterine Bleeding following Manual Vacuum Aspiration

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Abstract:

Manual vacuum aspiration is the most frequently used surgical method to perform first- trimester abortion with minimum complication. Severe uterine bleeding following this procedure is rare usually due to incomplete evacuation. But rarely it may occur in spite of an empty uterine cavity which is very difficult to treat especially when the uterus is to be preserved. A 35 years old multiparous woman was referred to the emergency unit of the obstetrics & gynaecology department of Ad-din hospital, Kushtia with a history of severe per vaginal bleeding following manual vacuum aspiration 7 days back. She was found severely anaemic and was almost in shock. Ultrasonography report revealed no retained product of conception in the uterine cavity. Then blood transfusion, tranexamic acid, antibiotics and also progesterone were given. Gradually she was settled and per vaginal bleeding was stopped completely. But after one week severe haemorrhage recurred. Then we decide to perform hysterectomy to save the life of the patient. As she & her husband requested to preserve uterus somehow if possible. So we think about conservative surgery. We put anabsorbable haemostatic gelatine sponge inside the uterine cavity under anaesthesia with keeping the arrangement forhysterectomy. Fortunately, bleeding was stopped within few minutes. During follow-up period of 6 months she was completely alright. Though data of long-term effects areunavailable, it is an excellent way to treat uncontrolled, severe uterine bleeding of unknown origin.

Keywords: Absorbable Haemostatic Gelatine Sponge, Manual Vacuum Aspiration (MVA),

Received: 12.10.2020, Accepted: 17.11.2020. Ad-din Medical Journal. 2021; 2 (1): 25-27

Introduction

Worldwide abortions complicate 30% to 40% of pregnancy ¹. Among this, 10% to 30% ² are induced abortion which varies from country to country. Manual vacuum aspiration (MVA) is the safest and 98% effective surgical method of induced abortion³⁻⁵. Very infrequently some complications occur as infection (0.5%) injury to the cervix, excessive per vaginal bleeding, failure to evacuate completely⁶, perforation of the uterus(.3%)^{7,8}. Excessive uterine haemorrhage is usually due to incomplete MVA. Rarelymay it happen in spite of complete evacuation which is usually stopped by medical treatment. When medical treatment failed to stop severe

bleeding then hysterectomy usually performed as alifesavingprocedure. Topical use of absorbable haemostatic gelatine sponge inside the uterine cavity is an excellent conservative surgery to avoid hysterectomy. In this case report, such type of procedure was applied to a patient in the obstetrics &gynaecology department of Ad-din hospital, Kushtia. It is relatively a newer & uncommon technique.

Case Report

A 35 years old woman was referred to the emergency unit of the obstetrics& gynaecology department of Ad-din hospital, Kushtia with continuous & profuse per vaginal bleeding for 6 hours. She had history of taking abortifacient drugs during 10 weeks of gestation but it was failed. So manual vacuum aspiration was performed in a local clinic 7 days back. She is a mother of 2 daughters born by caesarean section & age of her last child was 7 years.

On examination, she was almost in shock, severely pale, pulse rate was 116 per minute,

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blood pressure was 80/40 mm of Hg. Per abdominal examination revealed no abnormalities. Excessive per vaginal bleeding was noticed. Regarding investigations haemoglobin percentage was 6 gm /dl , tests for coagulation disorder were normal, other tests as liver & renal function tests were normal. Ultrasonography report revealed no retained product of conception. So medical treatment was given including blood transfusion, Tranexamic acid, antibiotics, alsoprogesterone. Gradually her condition was improved.

After 7 days same problem has recurred. We repeat sonography which was normal. Then we counselled her husband and her attendants for hysterectomy to save her life. But they requested to preserve the uterus if possible. In operation theatre we think to apply absorbable haemostatic gelatine sponge (Figure-1) inside the uterine cavity under general anaesthesia with keeping ready everything for hysterectomy. The gel foam was cut into small pieces for the convenience to enter through partially opened os of the uterus. Thereafter we wait for few minutes. Gradually bleeding was reduced. Then with the consent of theattendants we wanted to keep her in follow-up and postponed hysterectomy.

Fortunately, there was no recurrence of per vaginal bleeding during her follow- up period of 6 months.



Figure 1: Absorbable haemostatic gelatine sponge.

Discussion:

Topical use of absorbable haemostatic gelatine sponge is an excellent cost- effective technique to stop uncontrolled, severe uterine bleeding of unknown cause. It is a very simple and easy procedure. In obstetrics and gynaecologic surgery its use is limited; commonly used in neuro and hepatobiliary surgery. Where there is no substitute for a meticulous surgical technique to stop bleeding and givingsuture or electrocautery are unsafe it is a very effective way to stop bleeding^{9,10}.

Haemostatic gel foam is a sterile sponge used dry or saturated with sterile sodium chloride solution, used to control capillary, venous and arteriolar bleeding. It is prepared from purified skin gelatine, capable of absorbing up to 45 times its weight of the whole blood¹¹. It forms a matrix at the site of bleeding which activates extrinsic coagulation cascade and serves as a scaffold for clot formation¹². It liquefied within one week and completely within 4-6 weeks¹³⁻¹⁶. Adverse effects include infection, foreign body reaction¹⁷⁻¹⁹, granuloma formation, adhesion, allergic reaction, embolization. The absolute contraindication is severe coagulopathy²⁰. Regarding efficacy, high quality data are not available.

Conclusion

Because use of topical hemostatic agents may increase the risk of complications, it should not be used for routine prophylaxis of postoperative bleeding andin case of less severe haemorrhage it is not recommended routinely. As data of long term complications are unavailable, recommendation of its use in the obstetrics & gynaecologic surgery largely based on findings extrapolated from studies on the use of these agents in non-obstetrics & gynaecologic surgeries.

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