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Next Generation Sequencing (NGS): A New Era for Precision Medicine

Miah MNA

Next-generation sequencing (NGS) is a new technology used for DNA and RNA sequencing and variant/mutation detection. NGS can sequence hundreds and thousands of genes or even the whole genome in a short period of time. The sequence variants detected by NGS have been widely used for disease diagnosis, prognosis, therapeutic decisions, and follow-up of patients, and the massive parallel sequencing capacity offers new opportunities for personalized precision medicine.^{1,2}

NGS has revolutionized the field of genomics and is rapidly transforming clinical diagnosis and precision medicine. This technology enables rapid and cost-effective analysis of large-scale genomic data, allowing comprehensive exploration of the genetic landscape of diseases.³ In clinical diagnosis, NGS is a powerful tool for identifying disease-causing variants, enabling accurate and early detection of genetic disorders.⁴ Additionally, NGS supports the discovery of novel disease-associated genes and variants, helping develop targeted therapies and personalized treatment strategies.⁵

NGS benefits precision medicine by enhancing the understanding of disease mechanisms and enabling the identification of molecular markers for disease subtypes, thereby supporting individualized treatment approaches.⁶ Furthermore, NGS

contributes to non-invasive strategies such as liquid biopsy, useful for monitoring disease progression and treatment response.⁷ Although the potential of NGS is vast, challenges remain in data analysis, variant interpretation, and standardization of laboratory protocols.⁸

Precision medicine has demonstrated great promise in areas such as rare genetic disorders, oncology, and pharmacogenomics. Cystic fibrosis—an autosomal recessive disorder caused by *CFTR* gene mutations—has benefited from targeted therapies, including ivacaftor, which significantly improves pulmonary function in patients with specific gating mutations.^{9,10}

The cost of NGS has drastically decreased since the first human genome sequencing in 2003, which cost approximately \$2.7 billion.¹¹ Despite progress, challenges persist when analyzing highly polymorphic genomic regions. Managing large volumes of data generated by whole-genome sequencing (WGS) requires efficient data transfer, long-term storage, and high-performance computational resources.¹²

In conclusion, NGS has transformed the landscape of clinical diagnostics and precision medicine. By integrating NGS with other omics technologies and leveraging artificial intelligence-based

analytical tools, healthcare professionals can improve diagnostic accuracy and develop more precise, personalized therapeutic strategies.¹³

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ORIGINAL ARTICLE**Knowledge, Attitude and Perceptions about PCOS among Medical Students.****Pervin R¹, Rashid FJB², Khan M³, Debnath M⁴, Ghani T⁵****Abstract**

Background: - PCOS is a multisystem involving endocrine and metabolic heterogeneous disorders among reproductive aged women characterized by hormonal imbalances, irregular menstrual cycles, hyperandrogenism and polycystic ovary. It is most likely genetic origin influenced by environmental factors including diet, life style, social status.

Objectives: - The aim of the study was to evaluate knowledge, attitude, perception about PCOS among medical students.

Materials and Methods: - A cross sectional study was conducted among medical students (5th year) of Tangail Medical college, Tangail, Bangladesh from July 2023 to December 2023 using pre designed semi structured questionnaire. Data was collected among 113 students. Convenient sampling method was used. Data was analyzed by using IBM SPSS V-23.

Results: - A higher educational level about PCOS is helpful to attain satisfactory level of knowledge and positive attitudes. Among physician providing health education, awareness about clinical features and comorbidities were also high, total 113 respondents data were analyses, 81% participants had knowledge about problem of PCOS and 39% participant received Knowledge from friends. 65% participants thought that knowledge can be disseminated through mass media. All the participant 100% choose to comfort and counsel their friend revealing diagnosis of PCOS. Family members of all participants were supportive on revealing disease and 94% participants had supportive environment from college.

Conclusions: - Knowledge, awareness and positive attitude is essential for early diagnosis, management of PCOS and prevention of complications. Awareness program on educational Institute, group study discussion, meeting, campaigns greatly increase knowledge, Perception and lowered stigma and hesitancy.

Key words: PCOS, Knowledge, Attitude and Perception

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Introduction

Polycystic ovarian syndrome is a multisystem disorder of unknown etiology. It is a common hormonal problem in reproductive age group. Polycystic ovary, hormonal imbalance, and irregular periods are tell-tale signs and symptoms of PCOS. It is most likely genetic origin. This is not only affecting fertility of women with hormonal imbalances but also predispose them to risk of DM and heart disease.^{2,3} It has been reported that increasing awareness about the disease led to better management of negative outcomes associated with PCOS. Colwell and colleagues reported that following a clinical research study, women with PCOS felt empowered regarding knowledge and were motivated to follow preventive Strategies.⁴ Disparity in knowledge, attitude, perception are different across different populations and healthcare settings. Addressing this disparity necessitates a multifaceted approach

involving education, awareness campaign.

Objectives: - The aim of the study was to evaluate knowledge, attitude, perception about PCOS among medical students.

Materials and Methods: - A cross sectional study was conducted among medical students (5th year) of Tangail Medical college, Tangail, Bangladesh from July 2023 to December 2023 using pre designed semi structured questionnaire. Data was collected among 113 students. Convenient sampling method was used. Data was analyzed by using IBM SPSS V-23.

influenced by environmental factors including diet, life style, social status. Globally prevalence of PCOS range from 2.2 to 2.6%. According to the Rotterdam Criteria, prevalence of PCOS was found to be 9.13% in south India¹.

Results

This study was conducted among 113 medical students. All were familiar about PCOS. Among them, 47% gathered knowledge from their friends, 42% from health education and 13% from mass media. About 94% students recognized that menstrual irregularities is the manifestation of PCOS, 37% realized that delayed pregnancy is other symptoms. Others were grasped that, obesity and excess hair also manifested in PCOS. About 82% had grip that DM associated with PCOS and respondents also command that HTN and metabolism abnormalities occurs in long term case and 89% participant agreed that weight reduction improve PCOS. Among respondents 66% thought that PCOS patient hide their diagnosis and 81% revealed that lack of knowledge is the main reason for hiding diagnosis and 32% participant revealed, social stigmata is another reason. All of participant were comfort and counsel with her friends to reveal the diagnosis and 100% participant thought family members were supportive on revealing disease and 94% participant found supportive environment with their colleague in PCOS patient. About 65% participants thought that knowledge of PCOS can be disseminated through mass media and 68% participants

know that OCP is helpful in PCOS and 68% participants had idea about weight reduction increase insulin sensitivity, reduce PCOS complications. 60% participants thought that gynecologist are

the best person to treat PCOS, 35% thought, PCOS patient need endocrinologist.

Table1: Respondents knowledge regarding PCOS

Knowledge regarding PCOS	Frequency	Percentage
Have you heard about PCOS	Yes	100%
	No	0%
From whom of knowledge	Friends	47%
	Mass media	13%
	Health education	42%
What are the problems of PCOS	Delay in pregnancy	37%
	Menstrual problems	94%
	Excess hair	44%
	Obesity	52%
What is the systemic disease associated	Diabetes	82%
	Hypertension	30%
	Metabolism	25%
Methods of treatment	Weight reduction	89%
	Ovarian surgery	10%
	Subcutaneous injection	1%

Discussion:

Polycystic ovarian syndrome is a chronic endocrine disorder commonly occurs on reproductive age women.

This is study was conducted to asses knowledge about PCOS, attitude and perception of undergraduate medical students.

A study done in India revealed that 72% medical student were aware of PCOS⁵, Shunnda B et al⁶ found 76% samples were average knowledge, 10.7% good knowledge about PCOS. An effective

educational programme is the most significant socio demographic factor for attaining knowledge of PCOS. In our study, majority gathered knowledge from friends due to sharing of knowledge is adequate among medical student. Most of our study people were aware of PCOS associated symptom like ,menstrual abnormality, obesity, Similar result found in study of. Alessa et al⁷ and Mohammad et al⁸. About 89% of our participant agreed that weight reduction is primary modality of treatment.

Table 2: Respondents attitude towards PCOS

Attitude toward PCOS	Frequency	Percentage
Do you think with PCOS will hide their diagnosis	YES	66%
	NO	37%
Reason of hiding diagnosis	Stigmata	32%
	Lack of knowledge	81%
Your action when your friend reveals PCOS diagnosis	Comfort her	100%
	Shy away from her	0%
What would be attitude of your family member on revealing disease	Supportive	100%
	Non supportive	0%
What would be attitude of your colleague	Supportive	94%
	Non supportive	4%

Table3: Respondents perception regarding PCOS

Perception for PCOS	Frequency	Percentage
How do you think knowledge about PCOS can be design mentioned	Mass media	65%
	social media	44%
	Govt. website	25%
How dose weight reduction helps in PCOS	Increase insulin sensitively	69%
	Improve ovulation	47%
	Improve psychological condition	8%
Is OCP helpful	Yes	74%
	No	26%
Who is the best person to treat PCOS	Gynecologist	60`%
	Endocrinologist	35%
	Physician	2%
	Dermatologist	3%

In a study Jena et al⁹ shows 70% aware of diet restriction and exercise. Lack of knowledge about PCOS is the causes of this dissimilarities. Our participant agreed that long term complication of PCOS are DM,

HTN, Insulin resistant, which are commonly reported in a study by Piltoren et al¹⁰. Most of the participant in our study had positive attitude towards disease and all of them choose to comfort and counsel their

friends to reveal diagnosis. Sharing education from friends about disease and treatment option were taking more important as they were emotionally attached with their friends. Participant thought that PCOS patient hide their diagnosis due to lack of knowledge and social stigmata. A study conducted by

Conclusion:

Knowledge, awareness about PCOS and positive attitude towards disease are essential for early diagnosis, management of disease and prevention of complications. Awareness programme on educational Institute, group discussion, meeting, campaign should be arranged more frequently, thus it will increase knowledge about PCOS. So that, this knowledge will help to lower social stigma and hesitancy.

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Colwell et al¹¹ reported that many women expressed their frustration in communication and remain depressed. About 80% participant thought that gynecologist are the best person for treatment of PCOS as they seek attention to the gynecologist for treatment of delayed pregnant and irregular menses.¹²

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ORIGINAL ARTICLE

Evaluation of Results of T-Y Condylar Fracture of Distal Humerus in Adults Fixed by Reconstruction Plates and Intercondylar Cannulated Cancellous Screw.

Singha SK¹, Rahmam MM², Rokonuzzaman SM³, Mohammed KH⁴, Rahman MA⁵, Yasmin S⁶

Abstract

Aim: T-Y condylar fracture of distal humerus in adults are most difficult challenging fracture. The principle is anatomical reduction and fixation with stabilization of extra-osseous implants. The functional outcome greatly influenced by the early rehabilitative exercise. Our aim was evaluate the functional outcome of T-Y condylar fracture of distal humerus in adults fixed by reconstruction plate and intercondylar screws .

Material and method: This is a prospective study with 20 adults patients with T-Y condylar fractures fixed with reconstruction plate and cannulated intercondylar screws through transolecranon approach . We followed up for 12 months. Functional outcome was analyzed by MAYOS elbow performance score (MEPS) after 12 months follow up.

Results: Average age of the patients was 50.2 years, 12 cases were due to RTA and 8 cases were due to direct fall on the ground. 3 cases(15%) were of B1 type, 1 case (5%) was of B2 type, 6 cases (30%) were of C1 type, 5 cases (25%) were of C2 and 5 cases (25%) were of C3 according to AO classification. According to MAYOS elbow performance score (MEPS) at the end of 12 months follow up excellent results were found in 12 cases (60%), good in 4 (20%), fair in 3(15%) and poor results in 1(5%).

Conclusion: Reconstruction plate and inter condylar cannulated screw fixation for distal humeral fracture is very useful for complex T-Y condylar fracture by trans olecranon approach and early post operative rehabilitation . Clinical and radiological results showed a good healing rate with good range of motion.

Keywords: Distal Humerus, T-Y Condylar Fracture, Reconstruction Plate, Cannulated Inter Condylar Screw, Trans Olecranon Approach.

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Introduction :

T-Y condylar fracture contribute a small percentage of all fractures. Approximately 7% of all adult fractures involve the elbow, of these one- third involve the distal humerus¹. Distal humerus fractures, therefore comprise around 2% of all

fractures^{2,3}. Distal humerus fractures remain one of the most challenging injuries to manage⁴. Treatment outcomes are often associated with elbow stiffness, weakness and pain. A painless and mobile elbow joint is desired. Depending upon the

comminution and displacement, open reduction and inter fixation with one 3rd tubular plate, pre contour LCP, reconstruction plate, Kirshner wire and double tension band wiring can be done individually or in combination⁷⁻⁹. The results of operative fixation of fractures of distal humerus remained unpredictable until improve techniques for the fixation of small articular fractures as developed by the Arbeitsgemeinschaft für osteosynthesefragen/ association for the study of internal fixation (AO/ASIF) and others were applied^{10,11}.

With the available literature, fixation with two plates at 90° angle with one another has become the standard of care^{12,13}. A surgeon treating a healthy active patient with a fracture of distal humerus should make a every attempt to reconstruct and preserve distal humerus^{14,15}. Residual elbow stiffness remains the worst complication of T-Y condylar fractures as it is poorly tolerated because of lack of compensatory adjacent joints¹³.

We evaluate the functional outcome of operative management of T-Y condylar fractures in adults by reconstruction plate

and cannulatedintercondylar screws through trans olecranon approach.

Methods: This study carried out in 250 bedded General Hospital, Tangail (SHMC) and difference hospital in Tangail. Taking approval from the ethical committee, we recruited 20 cases of T-Y condylar fracture

There were no intra operative complications. In post operativeperiod,

of distal humerus from July, 2020 to June, 2021 with defined inclusion and exclusion criteria. Patients age above 20 years with T-Y condylar fracture of distal humerus have been included in this study. Patients with compound fractures of distal humerus and old fractures of distal humerus have excluded for this study.

A throughclinical and radiological examination was performed before operation . All cases were treated surgically with reconstruction plate and cannulated (intercondylar) screws to reconstruction the fracture fragments. First condyles are assembled. All the patients are followed up at the end of 1, 3 , 6 and 12 months with radiological and functional evaluation with MAYOS elbow performance score (MEPS) .

The descriptive statistics were report as mean (SD) continuous, variable, frequency (percentage) for categorical variable. Dates were statistically evaluated. The P value of less than. 05 was considered significant.

Results: All 20 cases of T-Y condylar fractures of distal humerus treated by open and internal fixation by reconstruction plate and cannulated (intercondylar) screws through trans olecranonapproach.

The age of the patients were between 21-70 years with average age 50.2 years. The maximum incidence was in the fourth (n=12) and fifth decade (n=8). Males were 70% and females were 30%. A total of 8 cases (40%) were due to direct fall and 12 (60%) cases were due to road traffic accidents.

patients reported complication such as ulnar neuropathy [n=1,2.5%] with spontaneous

recovery after 6 weeks. Superficial infection [n=1, 2.5%] treated with

antibiotics according to culture and sensitivity, non -union [n=0].



Figure 1: Pre-operative A-P and Lateral radiographes showing T-Y condylar fractures of distal Humerus.



Figure 2: Post-operative A-P and Lateral radiographes showing T-Y condylar fractures of distal Humerus.

In this study at the 12 months there were 12 cases (60%) had excellent results , 4 (20%) had good results , 3 (15%) had fair results

and 1 (5%) had poor result as per MAYOS elbow performance (MEPS) .

Table 1: MEYOS elbow performance (MEPS) score

Pain	None	45	Excellent>90
	Mild	30	
	Moderate	15	
	Severe	0	
Motion	Arc>100	20	Good,75-89
	Arc 50-100	15	
	Arc<50	5	
Stability	Stable	10	Fair,60-74
	Moderate instability	5	
	Gross instability	0	
Function	Comb hair	5	Poor<60
	Feed	5	
	Hygiene	5	
	Shirt	5	
	Shoe	5	
Total		100	

In our studies according to AO classification of distal humeral fractures , there were 3 cases of type B₁fractures, 1(5%) cases of type B₂, 6 (30%) cases of

type C₁ , 5 (25%) cases of type C₃ fractures. In our 20 cases there some associated injuries (1 ulnar fracture ,

Table 2: Type of fracture

Results	B ₁ N(0%)	B ₂ N(%)	C ₁ N(%)	C ₂ N(%)	C ₃ N(%)	Total
Excellent	2	1	5	3	1	12
Good	1	-	-	1	2	4
Fair	-	-	-	1	2	3
Poor	-	-	1	-	-	1
Total	3	1	6	5	5	20

Discussion:

We can solve this problem by stabilization of fracture fragments with plate osteosynthesis based on restoration of joint congruity.

Treatment like close reduction and immobilization and limited internal fixation have results in significant functional impairment and loss of range of motion.

Hence it is now generally accepted that most favorable outcome of displaced intra articular fracture is provided by surgical reconstruction .

In our study a posterior approach and chevron V-shaped olecranon osteotomy done in all cases.

In this study there was no non union of olecranon osteotomy. All fractures and chevron V osteotomy united within 16 weeks.

In our study we use Recon plate and intercondylar screws to reconstructs the both medial and lateral condyles there provide angular stability.

There is no consensus that weather the orthogonal or parallel platingis superior for fracture.

We use malleable recon plate because it provides better mechanical stability and less soft tissue dissection.

Functional outcome was based upon MAYOS elbow performance score, which was excellent 12 (60%) cases, good in 4 (20%), fair in 3 (15%) ,poor in 1 (5%) case.

Conclusion:

T-Y condylar fracture of distal humerus is a grave for the orthopedic surgeons because of unpredictable outcome .Anatomical reduction and stable fixation for complex T-Y condylar fractures of distal humerus done by recon plate through trans olecranon

approach is the difficult operation. Regular follow up and facilitating early post operative rehabilitation is the most important to improve the quality joint as well as functional quality of life.

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ORIGINAL ARTICLE**Conservative Treatment for Acute Appendicitis with Lump Formation and its Subsequent Management****Ahmed F¹, Hanif A²****Abstract****Background:**

Lump formation after acute appendicitis with subsequent management by interval appendectomy remains controversial. I conducted this study to determine the risk of recurrent appendicitis following initial non-operative treatment for appendicitis and evaluate factors associated with recurrence. Secondly, we evaluate the efficacy of interval appendectomy versus no appendectomy.

Materials and Methods:

Patients who received conservative treatment for appendicitis with lump formation were prospectively studied from Jan 2016 to Feb 2018. These patients were followed for recurrence of appendicitis.

Results:

Of 763 patients with acute appendicitis some 220 patients had lump formation (28.8%). Median age was 28 years. Conservative treatment was successful in 213 (96.8%) patients. The rate of recurrence was 13.1%, all occurring within six months after the index admission. Mean follow-up was 26±18 months.

Conclusion:

Conservative treatment of appendicitis with lump formation is efficient and the recurrence rate is low. Routine interval appendectomy after initial conservative treatment for lump formation is not a cost-effective intervention and not recommended.

Key words: Acute Appendicitis, Lump, Conservative Treatment

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Introduction

Management of acute appendicitis is purely surgical. However, in the setting of appendicitis with lump formation initial non-operative management has been shown to be safe and effective.[1–3] The treatment of appendicitis with lump has been debated for more than 100 years. Conservative treatment is an established practice, but the necessity of interval appendectomy remains controversial.

Advocates of interval appendectomy propose that appendectomy prevents recurrence and gives definitive treatment.[4–6] Appendectomy can also provide a definitive diagnosis, and may sometimes reveal an unexpected malignancy. However, another group of surgeons who oppose this policy[7–9] point out that the rate of recurrent appendicitis is around 6–20%.[7,10,11]

and that the complication rate of interval appendectomy is not low (9–19%).[\[4,11,12\]](#) Furthermore, routine appendectomy may increase the cost for both patients and institutions. The aim of this study was to determine the risk of recurrent appendicitis following initial non-operative treatment for appendicitis, and evaluate factors associated with recurrence. Our hypothesis was that the risk of recurrent appendicitis is low and that interval appendectomy is not routinely indicated.

Materials And Methods

Patients who received conservative treatment for appendicitis with lump formation were prospectively studied from Jan 2016 to Feb 2018. Detailed history with clinical examination was done in every patient. Baseline investigations viz complete blood count, Urine R/E, USG lower abdomen was done in every patient. Every patient was treated with intravenous fluids, antibiotics (Third generation Cephalosporin, Amikacin and Metronidazole). Patients were only allowed orals after their condition improved clinically and biochemically. Patients were discharged home after complete resolution of symptoms.

Patients were followed up in outpatient department monthly for three months, bimonthly for another six months, and six monthly thereafter. If signs of recurrent appendicitis appeared (such as right lower quadrant pain, or tenderness with or without fever), USG was repeated and appendectomy was performed if recurrent appendicitis was confirmed. Data was collected and analyzed statistically using SPSS software.

Results

A total of 763 patients with acute appendicitis were treated from Jan 2016 to Feb 2018. Out of them 220 (28.8%) patients presented with lump formation. They were diagnosed clinically and confirmed by high resolution USG. High rate of lump formation was because of late referral and due to poor health care facilities available in our area. Seven patients in this group (3.2%) were operated in the index admission as they did not respond to conservative treatment.

The remaining 213 patients were followed up regularly in the outpatient department. Mean follow up was 32 months. Out of the total; 115 of them were men and 98 were women. Median age was 28 years (range 15–63 years). All patients had history of pain in the right lower abdomen. Most of the patients had classical history of pain, starting at the umbilicus then radiating to the right iliac region. Most of the patients (79.8%) had history of anorexia but nausea and vomiting was found in only 23.4% of patients. There was history of fever in 53.0% of the patients. All the patients had a lump palpable in the right iliac region on clinical examination. Right iliac region was tender in 84.5% of the patients [\[Table 1\]](#). There was no clinical difference in the primary clinical presentation between the cases that later developed recurrence and the patients who did not have recurrence.

Among 213 patients, 28 (13.1%) had recurrent appendicitis on follow-up and they were operated for the same. All these patients had recurrences within six months of the primary treatment [\[Figure 1\]](#). Most recurrences were detected as emergencies; $n=22$ (10.3%). Few patients were detected on follow up; $n=6$ (2.8%).

Table 1: Clinical presentation of patients of appendicitis with lump formation

Symptoms/Signs/Investigations	No. of patients	Percentage
Pain right lower abdomen	213	100
Nausea/Vomiting	50	23.4
Anorexia	170	79.8
Fever	113	53
Palpable lump	213	100
Tenderness in right iliac fossa	180	84.5
Leucocytosis	170	79.8

Table 2: Clinical presentation of patients who later had recurrence

Symptoms/Signs/Investigations	No. of patients	Percentage
Pain right lower abdomen	28	100
Nausea/Vomiting	6	21.4
Anorexia	21	75
Fever	15	53.5
Palpable lump	28	100
Tenderness in right iliac fossa	24	85.7
Leucocytosis	21	75

Discussion

Lump formation after acute appendicitis is as a result of walled off perforation of appendix. Lump can be an inflammatory mass consisting of inflamed appendix, adjacent viscera, and greater omentum or a pus containing appendiceal mass. Although management of acute appendicitis is primarily surgical, management of appendicitis with lump is controversial for more than a century now. Ochsner[13] introduced the conservative treatment for fear of dissemination of infection with

surgical intervention. McPherson and Kinmonth[14] reported that non-operative management of appendicitis with tumor formation achieved a 76% success rate and 0.8% mortality rate.

Currently, conservative treatment of appendicitis with lump formation is the preferred one.[7,8,11,15] The success rate of conservative treatment of appendicitis with tumor formation ranges from 76% to 97%.[6,14,16,17] CT- or ultrasound-guided drainage of an appendix abscess has made surgical drainage less common.[12,16,17]

However, some surgeons still advocate early surgical intervention instead of conservative approach,[10,16,18] although this approach has been criticized because of possibility of spread of previously localized infection, injury to surrounding structures, and overall higher complication rate.

After successful conservative treatment the question arises whether or not to perform interval appendectomy. The morbidity of interval appendectomy ranges from 3.4% to 19%[4,6,11,15,19–21] which can be compared to the reported incidence of recurrent appendicitis after conservative treatment of an appendix mass that ranges from 0% to 20%.[4,6–8,10–12] The danger of recurrence is reported to be greatest during the first 6 months after the initial episode and minimal after 2 years.[8]

Hoffmann *et al.*,[8] and Lai *et al.*,[22] also suggested that routine elective appendectomy can be safely omitted in more than 80% of patients. Two systematic reviews Andersson, Petzold[23] and Simillis *et al.*,[24] in their studies also support the practice of nonsurgical treatment without interval appendectomy in patients with appendiceal abscess or phlegmon.

Conclusion

Conservative treatment is efficient in most patients with appendicitis with a lump formation. The risk of recurrence is low, which does not motivate routine interval appendectomy after initial conservative treatment.

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ORIGINAL ARTICLE**Association of Serum Adiponectin Level with Gestational Diabetes Mellitus (GDM)****Nahar NS¹, Akhtar N², Begum K³, Tabassum M⁴, Sultana A⁵, Alam AFMS⁶****Abstract****Background**

Early prediction of GDM by measuring a biomarker at first trimester of pregnancy may prevent maternal and fetal complication. Adiponectin, which modulate insulin sensitivity, is secreted from adipose tissue and decreases blood glucose level. The objective of the study was to evaluate the association of maternal first trimester serum adiponectin with development of GDM.

Methodology

This longitudinal study was conducted in the BSMMU, Dhaka from June, 2021 to May, 2022 where pregnant women of 11-14 weeks of gestation were selected by purposive convenient sampling. At first 94 pregnant women were selected after excluding GDM and their serum adiponectin level was measured. Then the participants were followed up at 24-28 weeks of gestation and OGTT was done to detect GDM. The respondents were divided into 'low adiponectin' group and 'normal adiponectin' group. Differences between two groups were assessed by statistical test. ROC was used to decide the best cut-off point of adiponectin level.

Results

A total 18 respondents developed GDM from both low and normal adiponectin group. In low adiponectin group, out of 26 respondents 13 developed GDM and remaining 13 were euglycemic. Whereas in normal adiponectin group, out of 62 respondents, majority 57 were euglycemic and only 5 women developed GDM. ROC analysis of adiponectin level for detection of GDM, a AUC value 0.887 (95% confidence interval 0.802-0.972) was found which was statistically significant ($p < 0.001$). A cut off value of ≤ 10.165 $\mu\text{g/ml}$ showed the highest youden index (0.651) with 83.3% sensitivity and 81.4% specificity, the accuracy was 79.5%. Moreover a cut of value ≤ 10.165 $\mu\text{g/ml}$ showed PPV and NPV of 50.8% and 92.8% respectively.

Conclusion:

Study finding revealed that maternal serum adiponectin level was lower at 11-14 weeks of pregnancy to those patients who subsequently developed GDM. So a low adiponectin level at 11-14 weeks of pregnancy may be a new risk factor for GDM.

Key words: Adiponectin, Gestational Diabetes Mellitus (GDM), Insulin Resistance*J. Tangail Medical College, 2025; 2(1): 22-28*

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Introduction

The incidence of gestational diabetes mellitus (GDM) is increasing globally which affects 3-10% of pregnancies worldwide [1] with an increased risk of short and long term ill health for both mother and off spring. In Bangladesh, prevalence of GDM is quite high with frequencies around 7 - 14% [2]. Adipose tissue is a highly active endocrine organ and produces a number of adipocytokines like adiponectin, leptin, resistin, vispatin etc. Adiponectin is a physiologically active polypeptide hormone. Insulin is the main regulator of it's secretion from adipocytes. It stimulates glucose uptake and fatty acid oxidation by binding to it's receptor (typically adipoR1 and adipoR2) and activating AMP activated protein kinase (AMPK) and peroxisome proliferator activated receptor α (PPAR- α) in liver and skeletal muscle. It decreases glucose concentration by inhibition of gluconeogenesis. It reduces the use of insulin by stimulator effect in beta oxidation of fatty acid in skeletal muscle [3]. Plasma adiponectin is inversely correlated with body mass index (BMI), intra-abdominal fat and incidences of insulin resistance.

Low concentration of adiponectin has been reported in GDM subject during pregnancy. Some studies reported that risk of GDM is 5-6 times higher in women with low adiponectin level than women with normal or high level [4]. Adiponectin is not expressed nor produced by the placenta. Maternal adipose tissue is the major source of maternal plasma adiponectin, so it can be assessed as an independent biomarker.

Methodology

This prospective cohort study was conducted in outpatient department of both Feto-maternal Medicine and general Obs & Gynae, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka over a period of 1 year from June, 2021 to May, 2022. The study population included pregnant women at 11-14 weeks who were found non-diabetic (normal OGTT) and singleton pregnancy. A total 94 pregnant women were selected by purposive and convenient sampling who fulfilled the inclusion and exclusion criteria. Inclusion criteria was pregnant women who were non-diabetic (normal OGTT) at their 11 to 14 weeks of gestation. Exclusion criteria were multiple pregnancy, pre-existing diabetes mellitus, diagnosed case of cardiovascular disease, chronic hypertension, previous history of pre-eclampsia, eclampsia or SLE. Data regarding demographic profile (e.g. age, BMI, educational status), previous history of GDM, family history were recorded in a semi structured questionnaire. Obstetrics history like gravidity, parity, gestational weeks, past history of any other medical disorders was documented. Then a complete physical examination was carried out by researcher including height, weight, BMI, BP, anemia, edema, etc. Blood sample was collected and sent to the microbiology laboratory of BSMMU for serum adiponectin assay by ELISA method. The participants were followed up between 24-28 weeks by doing OGTT to detect GDM. Six (6) patients were failed to follow up and 88 patients were finally selected for

the study. Data was analyzed by SPSS statistical software.

Results

Normal distribution of the continuous variables was checked first before comparing the means between low and normal adiponectin patients and between

GDM and normal patients. Then according to the result parametric and non-parametric test were selected for comparing means of the two groups. ROC analysis of adiponectin level for detection of GDM among pregnant women found an AUC value of 0.887 (95% CI 0.802-0.972) which was statistically significant ($P < 0.001$) (Figure:1 and Table 1).

Figure 1: ROC curve for first trimester serum adiponectin level

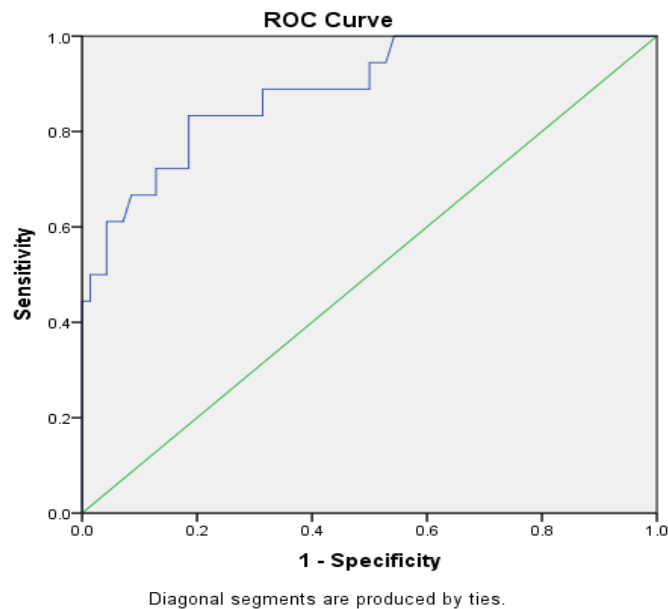


Table 1: Area Under the Curve.

Test Result Variable(s): adiponectin				
Area	Std. Error ^a	P value	95% Confidence Interval	
			Lower Bound	Upper Bound
0.887	0.043	<0.001	0.802	0.972

Table 2 shows a cut-off value of ≤ 10.165 showed the highest Youden index (0.651) with 83.3% sensitivity and 81.4% specificity. In addition, the accuracy was

79.5%. Moreover, A cut-off value of ≤ 10.165 showed, PPV and NPV of 50.8% and 92.8%.

Table 2: Determination of cut off value with Youden Index.

Cutoff value	Sensitivity	Specificity	PPV	NPV	Accuracy	youden index (j=sen+spe-1)
10.115	0.722	0.814	0.486	0.889	0.784	0.541
10.165	0.833	0.814	0.508	0.916	0.795	0.651
10.230	0.833	0.801	0.474	0.928	0.772	0.632

A significant association was found between development of GDM and adiponectin level ($P < 0.001$). The odds for developing GDM due to low adiponectin

are 11.4 [95% CI: 3.45 – 37.64]. About 72.2% GDM patients had low adiponectin level. However, only 18.6% normal patients had low adiponectin level (Table-4).

Table 3: Cross tabulation of GDM with adiponectin level based on derived cut-off value.

Adiponectin ($\mu\text{gm/ml}$)	GDM	Non-GDM	Total
≤ 10.165	True positive 13	False positive 13	26 (TP+FP)
> 10.165	False negative 5	True negative 57	62 (FN+TN)
	All patients with GDM (TP+FN) 18	All patients without GDM (FP+TN) 70	88 (TP+FN+FP+TN)

Table 4: Association of GDM with low adiponectin.

		GDM		OR	P value
		Yes	No		
Adiponectin ($\mu\text{g/ml}$)	Low (≤ 10.165)	13 (72.2%)	13 (18.6%)	11.4	<0.001
	Normal (> 10.165)	05 (27.8%)	57 (81.4%)		
Total		18	70		

Here, P value obtained from chi square test.

Discussion:

This prospective longitudinal study was carried out among 88 women with singleton pregnancy at their 11-14 weeks of gestation, having no evidence of GDM, attending at Fetomaternal medicine and General Obstetric and Gynaecology OPD of BSMMU, Dhaka during the period of from 1st August, 2021 to 28th February 2022. The responders were divided into two groups. One group with low adiponectin ($\leq 10.165 \mu\text{g/ml}$) and another group with normal adiponectin level ($> 10.165 \mu\text{g/ml}$). 26 women (29%) were in low adiponectin group and 62 (71%) women were in normal adiponectin group. During follow up 18(20.5%) women developed GDM and 70 (79.5%) were diagnosed as non GDM. Percentage of the patient developed GDM in these two groups were compared. Normal distribution of the continuous variables was checked first before comparing the means between low and normal adiponectin

patients and between GDM and normal patients. Parametric (independent sample t test) test was run to determine a significance difference of age, BMI and adiponectin between groups. Non parametric (Mann Whitney test) test was run to determine a significance difference of 24 to 28 weeks fasting blood glucose and 2 hours after 75 gm glucose between groups.

ROC analysis of adiponectin level for detection of GDM among pregnant women found an AUC value of 0.887 (95% CI 0.802-0.972) which was statistically significant ($P < 0.001$). A cut-off value of $\leq 10.165 \mu\text{g/ml}$ showed the highest Youden index (0.651) with 83.3% sensitivity and 81.4% specificity. In addition, the accuracy was 79.5%. Moreover, A cut-off value of $\leq 10.165 \mu\text{g/ml}$ showed, PPV and NPV of 50.8% and 92.8%. In a study by Madhu et al (2019), ROC curve revealed a cut-off value of adiponectin was $9.1 \mu\text{g/ml}$ in

the first trimester with 100% sensitivity and 95.6% specificity in predicting GDM [5].

In this study, the levels of serum adiponectin were significantly lower in GDM subjects (8.24 ± 2.31) $\mu\text{g}/\text{ml}$ than healthy pregnant women (11.83 ± 1.76) $\mu\text{g}/\text{ml}$ and related adversely to blood glucose level. Moreover, a significant association was found between development of GDM and adiponectin level ($P < 0.001$). The odds for developing GDM due to low adiponectin were 11.4 [95% CI: 3.45 – 37.64]. About 72.2% GDM patients had low adiponectin level. However, only 18.6% normal patients had low adiponectin level. Saini et al (2015) showed that adiponectin concentration was lower in pregnant women with GDM and found an inverse relationship between adiponectin level and fasting blood sugar [6]. Results of the study by Pala et al (2005) were similar to this study; adiponectin levels were significantly lower than the control group [7]. Tsai et al (2005) reported that the concentration of serum adiponectin was lower in GDM group [8]. A systematic review and meta-analysis have demonstrated a significant decline in adiponectin levels in GDM group vs. control group [9]

Conclusion:

In this longitudinal study, the level of adiponectin in first trimester of pregnancy was evaluated. The results of this study show that adiponectin has the potential to be used as an important screening biomarker for the first trimester which strongly predicts GDM in Bangladesh women. Apart from diagnosis, adiponectin levels can help

in stratifying pregnant women so that measures to prevent GDM can be instituted in the early pregnancy to the at-risk patients. In country with growing burden of GDM and inadequate resources, such information can significantly improve maternal and fetal outcomes in women at risk for GDM.

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CASE REPORT**Auto Transplantation Of Maxillary Left Canine - A Case Report****Das BK¹****Abstract**

Auto transplantation is a treatment alternative for impacted canine in improper position. The success of tooth transplantation depends on the vitality of the periodontal ligament(PDL) which attached to the donor tooth, complete or incomplete root formation and its viability decreases when it is exposed extra orally long time. In this paper, I present the auto transplantation of a maxillary left canine taken from same side of palate and surgically repositioned into the edentulous canine space.

Keywords: Auto Transplantation, Maxillary Left Canine

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Introduction:

Rapidly evolving implantation and alveolar ridge reconstruction techniques created a new area in modern dentistry where tooth loss is no longer a problem. Endless variations of implant's length, diameter, surface and design along with autogenous, allogeneous, alloplastic or xenogenous bone substitutes made it possible to recreate physiological occlusion, esthetic and masticatory function.

Auto transplantation may be defined as the transplantation of embedded, impacted or erupted teeth, from one site to another in the same individual in to extraction sites or surgically prepared sockets¹. Clinical case reports of successful auto transplantation first appeared in the 1950s when decayed first molars were replaced with transplanted immature third molars^{2,3}. Since that time usually especially premolar and canine, have been transplanted. It may provide a simplified and faster treatment option for patients with ectopic teeth specially for

adults who often reject the idea of wearing an appliance to align an ectopic tooth, yet would benefit from this tooth in the line of the arch⁴. Careful patient selection coupled with an appropriate technique can lead to exceptional esthetic and function results^{5,6}.

Case Summary:

A 25-Year-old female patient presented me with a missing maxillary left canine tooth with a hard swelling present palatally in the same side. Physical examination revealed a bony hard swelling at the palatal aspect of maxillary left 1st and 2nd premolar region. The orthopantomogram and occlusal view study showed an ectopic upper left canine tooth placed palatally at the apical region of 1st and 2nd premolar. Auto transplantation of the ectopic canine was planned to repositioned in the edentulous canine space. Maintain all ethical issue, the patient was informed about the benefits and possible hazards of this type surgery.

Surgical procedure:

With all aseptic precaution, surgical procedure was done through palatal approach under local anesthesia. Crevicular incision given palatally from maxillary right central incisor to left first molar. Then full thickness mucoperiosteal flap reflected from maxillary right central incisor to left 1st molar. The bone overlying the crown of the canine was removed carefully with a rose head micromotor bur and bone nibbler. The fragments of bone stored in normal saline soaked gauze. The whole tooth removed from socket by holding the crown with an upper anterior forcep and kept it on normal saline soaked gauze. A socket prepared between left lateral incisor and 1st premolar by the help of micromotor bur with cooling arrangement. Then the tooth was placed into the newly formed socket by gentle finger pressure. Checked the normal occlusion and previously preserved bone fragments were placed around the tooth. After proper hemostasis repositioned the flap and suturing done with 2-0 vicryl. Splinting of the tooth carried out by flexible wire (30 gage) and made free from traumatic occlusal contacts with its mandibular opponent during all excursions of the mandible. Proper antibiotic and analgesic was prescribed. The postoperative period was uneventful. Endodontic treatment performed on the 3rd week and splinting removed on the 4th week. The patient was well in the follow up visits after three months and six months.

Discussion:

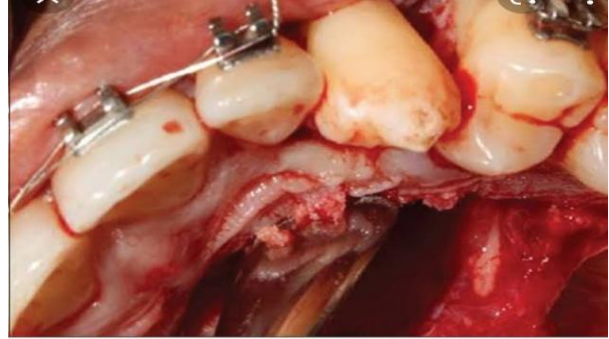
Missing tooth, whatever the etiology, present a problem for the dentist. A successful auto transplantation of graft is a superior alternative to a partial denture or a

fixed bridge in a young patient both clinically as well as financially. It should also be considered as a valid option in patients over 17 years of age in whom surgical exposure and prolonged orthodontic treatment to reposition a canine is often partially successful or completely unsuccessful and/or unacceptable to the patient on aesthetic of social ground. In the present case, the canine was ectopic in position and auto graft was the only choice for this tooth. The advantage of auto transplantation is that it acts physiologically to maintain the shape of the alveolar ridge providing proprioceptive stimuli, unlike a prosthesis or an Osseo integrate implanted. Careful atraumatic surgical technique to maximally preserve an intact periodontal ligament is the basic requirement for the success of a transplantation. In the reported case the tooth was extracted with forceps with minimal trauma to the periodontal ligament.

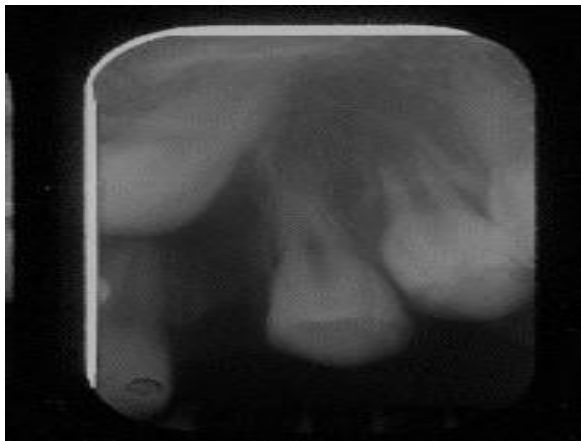
Splinting is not essential in auto transplantation but appears to be beneficial in most cases⁵. Most reports advice flexible splinting for 7-10 days to be more appropriate as this allows for some functional movement of the transplant that stimulates periodontal ligament cellular activity and bone repair⁶. Flexible splinting was used in the present case for this purpose. Loss of pulp vitality, poor periodontal healing and root resorption are complications of auto-transplantation. These complications can be minimized if mature transplants are root filled (RCT) within 4 weeks of transplantation⁷⁻⁸. Extra-alveolar endodontic treatment carried out at the time of transplantation increases the risk of subsequent root resorption as the root sheath is damaged during handling⁷.



Pre-operative profile picture



Per-operative picture



Pre-operative X-Ray



Post-operative X-Ray



Post-operative profile picture after six years

Protocol for Auto transplantation of Teeth:

➤ **Assessment of the patient**

1. Medical history: Have any chronic disease like diabetes, kidney diseases etc.
2. Examination: Good oral hygiene, Suitable donor tooth
3. Special tests: Intra-oral radiographs of donor and recipient sites.

➤ **Proper surgical procedure.**

In total surgical procedure maintain less trauma and proper sterilization.

➤ **Proper follow-up.**

A) 1 Week post-transplantation: Suture removal and base line post-operative periapical radiograph.

B) 4 Week post-transplantation: With completed root formation or signs of pathological changes start endodontic treatment with calcium hydroxide.

C) If no pathological changes: See 12 weeks post-operatively.

D) Long- term follow-up: Electric pulp tests at 6 months. 1 year, 5 years and 10 years.

Conclusion:

In this case report focuses on the auto transplantation of a maxillary canine taken from the palate side and surgically repositioned into the edentulous canine space. By using this technique, a prosthetic method such as a dental implant was

avoided. It can be a better option than orthodontic management of this type complain of patient.

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CASE REPORT**Gastric Outlet Obstruction (GOO) with Repeated Negative Biopsy – A Case Report****Gani ABMS¹, Miah MNA², Alam AFMS³, Qadir MS⁴, Rahman HH⁵, Quruni MO⁵****Abstract**

Gastric outlet obstruction (GOO) is a clinical syndrome characterized by abdominal pain and postprandial vomiting due to mechanical obstruction of the outlet of the stomach. Causes of gastric outlet obstruction ranges from benign to malignant condition. We report the case of a 49 year old male patient who presented with repeated post prandial vomiting, abdominal fullness and weight loss for 1 month. Endoscopy of upper GIT showed 1st part of duodenal obstruction. Biopsy for histopathology was sent for 2 times which showed nodular duodenitis but negative for malignancy. CT abdomen showed grossly thickened duodenum with luminal narrowing and intra-abdominal collection and pancreatic atrophy. CA 19-9 was elevated. PET CT –FDG was done which showed significant luminal narrowing in D1 duodenum with loss of fat plane with head of pancreas, FDG avid multiple omental deposit and peritoneal thickening. Omental biopsy was performed which showed metastatic adenocarcinoma. Immunohistochemistry markers showed focal positive of CDX2, CK20 and diffuse positive of CK7, MUC1, CK19 and MUC5AC which suggest metastatic adenocarcinoma, primary possibilities are upper GI tract or pancreatobiliary tract. Endoscopic ultrasound of upper GIT was done which did not show any pancreatic growth. Finally patient was diagnosed Stage IV duodenal adenocarcinoma with peritoneal metastasis.

Key words: Gastric Outlet Obstruction, Duodenal Adenocarcinoma, Biopsy Negative, Metastasis*J. Tangail Medical College, 2025; 2(1): 34-38*

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Received: 2nd December, 2024**Accepted:** 26th December, 2024**Background**

Gastric outlet obstruction (GOO) is a clinical syndrome that can manifest with a variety of symptoms, including abdominal pain, postprandial vomiting, early satiety, and weight loss. It is caused by either a benign or malignant mechanical obstruction or a motility disorder interfering with

gastric emptying. Anatomically, the mechanical obstruction can be at the distal stomach, pyloric channel, or duodenum and can be intrinsic or extrinsic to the stomach.^{1,2}

Peptic ulcer disease, specially caused by *H. Pylori* infection remain the most common cause for benign obstruction, carcinoma at gastric part or 1st part of duodenum is not uncommon. Distal gastric cancer is the most common malignancy, accounting for up to 35% of cases of GOO. The pancreatic adenocarcinoma with duodenal or gastric extension accounts for 15% to 25% of cases. Less common causes are neoplasms of the proximal duodenum and ampulla, gastric lymphoma, metastatic or primary duodenal malignancy, gastric carcinoid, and locally advanced gallbladder carcinoma or cholangiocarcinoma.³

Duodenal adenocarcinomas (DA) represent 0.3%–1% of gastrointestinal malignancies, with an incidence rate of less than 0.5/100,000.⁴ However, in terms of occurrence of small intestinal malignancies, DA represents a higher proportion, accounting for approximately 25%–35%.^{4,5} Early diagnosis of DA is challenging, as it lacks specific clinical features, so it is prone to missed diagnosis or misdiagnosis as biliary and pancreatic disease and then misses the optimal treatment time and finally develops into advanced DA.⁶ As a result, the prognosis for the disease is often poor.

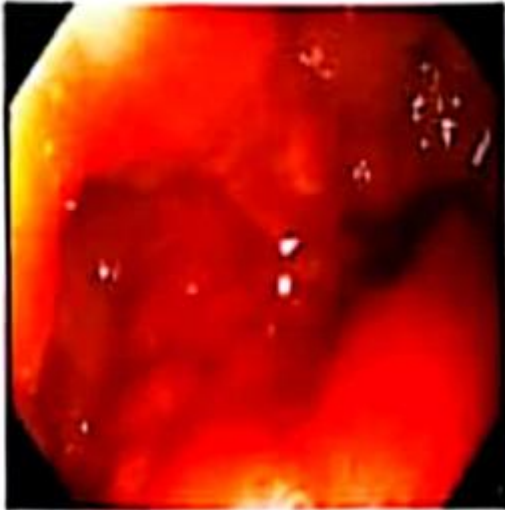
Case presentation:

A 49 year old male presented with multiple episodes of vomiting which is non-billious, non-projectile, non-blood stained and diffuse abdominal pain which precipitated by food and gradually progressive for 1 month. He noticed weight loss for last 2 months. There was no history of fever, GI bleed, altered bowel habits or shortness of

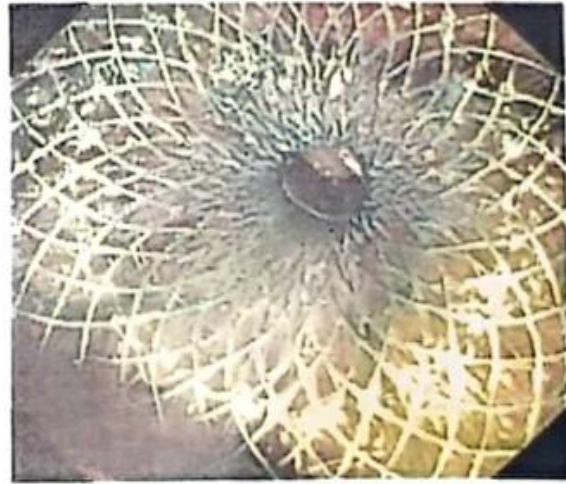
breath. He is diabetic for 14 years, and hypertensive for 18 years for which he takes several medicines but not always properly controlled. He is also suffering from chronic kidney disease and proteinuria but never required dialysis. He is ex-smoker, quit smoking 5 years back but before which he was smoker for 20 years. He has also history of occasional alcohol consumption for 10 years but quit alcohol taking 5 years back. On examination he was emaciated, dehydrated but not anemic or icteric. His blood pressure was 90/60 mm Hg, pulse 94/min, respiratory rate 14 breaths/min. There was no lymphadenopathy. His abdomen was tender specially over epigastric and right hypochondriac region but there was no organomegaly or ascites. Routine investigation revealed Hb-14.1 gm/dl, TLC-7640. Liver function test showed elevated ALP (140 IU), ALT-15 IU, AST 18IU. Serum total protein 8 gm/dl with s. albumin 3.9 gm/dl. Renal function test showed markedly elevated s. creatinine (5.1 mg/dl), electrolyte showed Na⁺-118mmol/L, K⁺-2.4mmol/L, HCO₃⁻-28mmol/L. Initially he was treated by intravenous fluid and electrolyte for acute kidney injury due to pre-renal failure. After 2 days his s. creatinine became 2.1 mg/dl, s. electrolyte became within normal range. After patient became stable, endoscopy of upper GIT was performed which showed ulcerated duodenal lesion with obstruction of 1st part of duodenum. Biopsy was sent for histopathology which revealed dense infiltration of acute and chronic inflammatory cells. The inflammatory cells are mostly lymphocytes, histiocytes, polymorphs and eosinophils. No granuloma

or evidence of malignancy was found. He was prescribed triple drug therapy for H. Pylori eradication, sucralfate and other

antidiabetic and antihypertensive medication.



Endoscopic view (Biopsy taken)



EUS guided GJ (SEMS placed)

He was advised to follow up after 14 days. His condition was deteriorated due to post prandial vomiting and he was again admitted with acute renal failure. After initial management when patient became stable he was referred to a higher specialized center. There CT abdomen was done which showed grossly thickened wall of 1st part of duodenum- most likely duodenitis with luminal narrowing and distended stomach. There was intra-abdominal collection, pneumobilia and pancreatic atrophy. His CA-19.9 was elevated (371 U/ml).

Repeat endoscopy was done which showed esophageal candidiasis and infiltrative duodenal growth. Biopsy showed chronic nodular duodenitis with numerous dilated lymphatics. In view of suspicion malignancy, patient underwent PET CT which showed FDG avid heterogeneous irregular ulcerated wall thickening is seen in

D1 duodenum with significant luminal narrowing with loss of fat plane with head of the pancreas. Stomach appears grossly distended- gastric outlet obstruction. FDG avid multiple soft tissue deposits/ omental nodularity, peritoneal thickening noted along the surface of the liver, paracolic gutters below anterior abdominal wall and in pelvis. Final impression was heterogenous irregular ulcerated growth (primary) at D1 duodenum with peritoneal metastasis. Later endoscopic ultrasound of upper GIT was done which showed gallbladder: distended and anechoic, CBD: proximal CBD (7cm) and anechoic till terminal end, pancreas: heterogenous echotexture in entire extent, pancreatic duct is normal. There was ascites, EUS guided FNB could not be done. Then USG guided omental biopsy was done which showed metastatic adenocarcinoma. GeneXpert was negative. Immunohistochemistry markers

showed no loss of nuclear expression of MMR protein low probability of microsatellite Instability high (MSI-H).

IHC markers showed –

1	CDX2	Focal positive (~50%)	4	CK19	Diffuse positive
2	CK7	Diffuse positive	5	MUC5AC	Diffuse positive
3	MUC1	Diffuse positive	6	CK20	Focal positive (~50%)
Impression: metastatic adenocarcinoma, possible primaries include:					
1	Upper GI tract				
2	Pancreaticobiliary tract				

Management:

Initially patient was introduced Naso-jejunal tube through endoscopy for feeding and medication.

Surgical gastroenterology was taken and advised for palliative chemotherapy.

Medical oncology opinion was taken and patient started on FOLFIRI regimen.

Later endoscopic ultrasound (EUS) guided Gastro-Jejunostomy with hot AXIOS SEMS placement was done for palliative management.

Discussion:

The incidence of non-ampullary DA is extremely low, and it has been suggested that the low incidence of DA may be related to the existence of some protective mechanism. For example, the duodenal transport rhythm is fast, which can effectively reduce the exposure of carcinogens; in addition, the presence of intestinal secretions and fluids has a certain protective effect against the relatively sterile duodenum.⁷ Except for the lower morbidity rate, many DA patients do not show symptoms until the tumor growth is large enough or even develops into an advanced stage, often lacking in specific clinical manifestations, so the early

diagnosis is extremely difficult; according to statistics, due to the above reasons, the average delayed diagnosis was about 2 to 15 months, and due to the complex tissue structure of the vicinity, patients are prone to misdiagnosis and missed diagnosis.^{8,9}

In this patient, repeated biopsy was negative. The probable cause for this may be due to presence of inflammation over the malignancy for which tissue sample could not be collected properly. Also there was complete obstruction of duodenum, so endoscopic probe could not be inserted beyond the growth for proper tissue biopsy. Raised CA 19-9 initially raised the suspicion of pancreatic cancer with duodenal extension. High degree of suspicion guided the physician for further investigation. CT abdomen and PET CT were performed in this context. Omental biopsy showed metastatic adenocarcinoma but origin of primary tumor was still uncertain. Immunohistochemistry marker showed probable origin of both upper GIT and pancreatobiliary malignancy. As tumor was inoperable at this stage, surgery with biopsy could not be possible which would be more accurate for tissue diagnosis. Finally, a team of physicians from different specialty consider all the investigations and patient's clinical features and agree that the

primary malignancy was duodenal adenocarcinoma more likely.

At this stage, there was no scope of radiotherapy or surgery. Regarding chemotherapy regimen FOLFOX regimen would be better for this malignancy but patient had chronic kidney disease. So medical oncologist choose FOLFIRI regimen for this patient which was infused through peripherally inserted central catheter (PICC) line. There was a challenge for maintaining nutrition as there was complete obstruction. Though initially feeding was given through naso-jejunal tube, patient was demotivated by this feeding. As laparotomy could not be possible, intervention gastroenterologist perform endoscopic ultrasound guided gastro-jejunoscopy which was successful. After 2 days patient was able to take food by mouth without any complication.

Conclusion:

Though adenocarcinoma in 1st part duodenum is extremely rare, it is not uncommon. Most of the time it present at advanced stage. Where there is dilemma regarding tissue diagnosis, clinical context, Immunohistochemistry marker and next generation sequencing (NGS) may help to specify the origin and type of malignancy.

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