The Journal of Teachers Association
ISSN 1019-8555 (Print) & ISSN 2408-8854 (Online)
Frequency: Bi-Annual
DOI: https://doi.org/10.62469/taj.v037i01.052

OPEN ACCESS
Website: www.tajrmc.com
Email: editor@tajrmc.com
Volume-37 | Issue-1 | Jan-Jun 2024

Management Strategies of Achalasia Cardia: A Study in Tertiary Care Hospitals

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Abstract: ***Background:*** Achalasia cardia is a rare esophageal motility disorder characterized by impaired lower esophageal sphincter (LES) relaxation and absent peristalsis, leading to progressive dysphagia, regurgitation, and weight loss. This study evaluates different management strategies for achalasia, comparing their efficacy and outcomes. ***Methods:*** This retrospective study was conducted from January 2004 to December 2009 at Bangabandhu Sheikh Mujib Medical University (BSMMU) and private hospitals in Dhaka. A total of 59 patients with diagnosed achalasia cardia were included. Patients were managed using medical therapy (nitrates, calcium channel blockers), pneumatic dilatation, laparotomy cardiomyotomy, or laparoscopic cardiomyotomy. Clinical presentation, treatment outcomes, complications, and recurrence rates were analyzed using SPSS. ***Results:*** Dysphagia and regurgitation were the commonest symptoms. Pneumatic dilatation provided symptomatic relief but had a high recurrence rate (45.0%). Surgical interventions, particularly laparoscopic cardiomyotomy, demonstrated superior long-term outcomes, with 75.0% of patients achieving satisfactory results. Laparoscopic cardiomyotomy was associated with shorter operative time (1.5 ± 0.6 hours vs. 2.1 ± 0.8 hours, $p<0.05$), earlier oral feeding (1.3 ± 0.9 days vs. 2.4 ± 1.1 days, $p<0.05$), and reduced hospital stay (3.3 ± 0.8 days vs. 5.8 ± 2.3 days, $p<0.05$) compared to laparotomy. Postoperative complications, including reflux and wound infections, were more frequent in the laparotomy group. ***Conclusion:*** Laparoscopic cardiomyotomy is the preferred surgical option for achalasia due to its favorable outcomes, including reduced complications, shorter hospital stays, and faster recovery. Pneumatic dilatation remains a viable non-surgical option but requires repeated procedures due to recurrence. Further studies are needed to refine treatment protocols and optimize patient outcomes.

Keywords: Achalasia Cardia, Lower Esophageal Sphincter, Pneumatic Dilatation, Laparotomy Cardiomyotomy, Laparoscopic Cardiomyotomy, Dysphagia.

Original Research Article

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How to cite this article:
Islam A, Rahman Z, Aziz MM, Eastiak MF, Arefin N, Forhad S, Islam KMR; Management Strategies of Achalasia Cardia: A Study in Tertiary Care Hospitals. Taj 2024;37 (1): 192-200.

Article history:
Received: January 22, 2024
Revised: February 16, 2024
Accepted: April 27, 2024
Published: June 30, 2024

Article at a glance:

Study Purpose: *Compare achalasia treatment outcomes.*
Key findings: *Laparoscopic cardiomyotomy is superior; pneumatic dilatation has high recurrence.*
Newer findings: *Confirms laparoscopic cardiomyotomy as the best surgical option.*
Abbreviations: *LES – Lower Esophageal Sphincter, PD – Pneumatic Dilatation, LCM – Laparoscopic Cardiomyotomy.*

INTRODUCTION

Achalasia cardia is a motility disorder of the oesophagus characterized by failure of the lower oesophageal sphincter to relax in response to swallowing and absence of peristalsis in the oesophageal body. Patients typically present with dysphagia, regurgitation and substernal chest pain. The incidence rate of radiologically confirmed cases

of achalasia in population studies averages between 0.5 – 2 cases / 10^5 population / year.[1] The etiology of achalasia cardia is unknown although a viral cause (varicella zoster), genetic influence (association with HLA loci) and autoimmune process have been postulated.[2] Main neurological abnormalities seen in achalasia are loss of ganglion cells (mainly inhibitory neurons) of the Auerbach's plexuses, degeneration of the nerve fibers of the vagal trunk and the abnormality of the dorsal nucleus of the vagus. Recent studies suggest that the cholinergic innervation of the sphincter is intact but selective destruction of non- cholinergic, noradrenergic inhibitory neurons.[3] Chuah *et al.* reported in their series that achalasia is a disorder of the esophagus characterized by aperistalsis and failure of the lower esophagus to relax, resulting in symptoms such as dysphagia, regurgitation, chest pain and weight loss.[4] Chowbey *et al.* reported that laparoscopic cardiomyotomy is an effective and minimally invasive treatment for achalasia cardia, offering shorter recovery times and reduced postoperative complications compared to open surgery.[5] Pohl and Tutuian *et al.* mentioned that achalasia is a primary esophageal disorder involving the body of the esophagus and lower esophageal sphincter affecting equally both genders and all ages.[6] While its etiology remains unclear, the pathophysiologic mechanism involves the destruction of the myenteric plexus responsible for esophageal peristalsis. Emblem *et al.* highlighted that surgical treatment for achalasia cardia provides significant symptom relief, with cardiomyotomy demonstrating favorable long-term outcomes despite the risk of postoperative complications.[7] There are many treatment options for achalasia cardia such as 1. Pharmacological treatment: Nitrates, Calcium-channel blockers, Anticholinergics, Theophylline, B2-agonists. 2. Endoscopic treatment: Balloon dilatation, Botulinum Toxin, Sclerotherapy 3. Surgical treatment: Conventional surgery (Thoracotomy and Laparotomy), Minimally invasive surgery (Thoracoscopy and Laparoscopy).[8] Many patients get benefit by treating with nitrate or calcium channel blocker or pneumatic dilation. But recurrence rate is high. Achalasia cardia gets good result by surgical treatment and laparoscopic cardiomyotomy is apparently the most effective treatment for achalasia cardia. It is impossible to normalize the motility disorders of the oesophagus. So, the management of the achalasia cardia aims at the weakening of the lower oesophageal sphinctric tone. Gaissert and Wain described achalasia as a primary esophageal motility disorder characterized by impaired lower esophageal sphincter relaxation and absent peristalsis, leading to progressive dysphagia and regurgitation.[9]

AIMS AND OBJECTIVE

General objective

To develop a standard management protocol for patient with achalasia cardia.

Specific objectives

To study the presentation and diagnosis of achalasia cardia.

To know which measures are taken to relieve the functional obstruction at the cardia and improve swallowing.

To reduce risk of complication like perforation, chest infection, malignancy etc.

To compare different options of management.

METHODS AND MATERIALS

Study Type: Retrospective study.

Study Period: January 2004 to December 2009.

Study Location: Bangabandhu Sheikh Mujib Medical University (BSMMU) and selected private hospitals in Dhaka.

Study Population

The study has been carried out on both male and female patients who were suffering from dysphagia and diagnosed as achalasia cardia both clinically and after investigations.

Inclusion Criteria

The study included patients aged between 15 and 60 years who were diagnosed with achalasia cardia. Patients were required to have a confirmed diagnosis based on clinical symptoms, barium swallow X-ray, and upper gastrointestinal (GI) endoscopy. The primary inclusion criterion was the presence of dysphagia due to achalasia cardia, with no evidence of other esophageal pathologies.

Exclusion Criteria

Patients were excluded from the study if they presented with dysphagia caused by conditions other than achalasia cardia, such as esophageal stricture or carcinoma of the esophagus.

Additionally, patients with dysphagia due to other esophageal motility disorders or structural abnormalities were also excluded. This ensured that the study population was homogeneous and focused solely on achalasia cardia.

Data Collection Procedure

Data were collected retrospectively from the medical records of patients treated in the Department of Surgery at Bangabandhu Sheikh Mujib Medical University (BSMMU) and from the private practices of individual consultants who managed achalasia cardia cases. A standardized Case Report Form (CRF) was used to extract information from patient histories, physical examinations, diagnostic investigations, and treatment procedures. The CRF included details such as clinical symptoms, diagnostic test results, treatment methods, and outcomes.

Data Analysis

Data analysis was performed using SPSS for Windows, version 12. Results were expressed as mean (± standard deviation), percentages, and ratios. Statistical tests, including the Chi-square test and ANOVA, were used to analyze the data. The findings were presented in tables and graphs to facilitate interpretation and comparison. The analysis aimed to identify trends, correlations, and outcomes related to the diagnosis and treatment of achalasia cardia.

This retrospective study was conducted over a five-year period, from January 2004 to December 2009, at BSMMU and other private hospitals in Dhaka, Bangladesh. Out of 63 patients invited to participate, 59 agreed, and 4 were excluded based on the exclusion criteria. Patients were diagnosed through a comprehensive evaluation, including clinical history, physical examination, routine investigations (e.g., complete blood count, blood sugar, serum creatinine, chest X-ray), and specialized tests such as barium swallow X-ray and upper GI endoscopy. Oesophageal manometry was not performed. Treatment methods included both surgical (laparotomy cardiomyotomy, laparoscopic cardiomyotomy, thoracotomy cardiomyotomy) and non-surgical approaches (medical treatment and pneumatic dilatation). Pre-operative and post-operative evaluations, along with follow-up data, were recorded and analyzed.

Ethical Implication

The study received ethical approval from the Scientific and Ethical Committee of the Bangladesh College of Physicians and Surgeons (BCPS). Informed consent was obtained from all participants, and patient confidentiality was maintained throughout the study. The research adhered to ethical guidelines, ensuring that the study was conducted with integrity and respect for patients' rights.

RESULTS

Table 1: Distribution of the Study Patients by Age and Sex Group (n=59)

Age group	Medical		Pneumatic Dilatation		Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
	n	%	n	%	n	%	n	%
15-25	0	0.0	2	10.0	2	20.0	3	15.0
25-35	2	22.2	6	30.0	2	20.0	6	30.0
35-45	6	66.7	8	40.0	4	40.0	4	20.0
45-55	0	0.0	3	15.0	1	10.0	5	25.0
55-65	1	11.1	1	5.0	1	10.0	1	5.0
>65	0	0.0	0	0.0	0	0.0	1	5.0
Mean±SD	38.8±8.2		35.2±10.3		36.4±12.5		37.6±13.2	
Range	(30-58)		(15-60)		(18-60)		(19-70)	
Sex								
Male	3	33.3	11	55.0	6	60.0	14	70.0
Female	6	66.7	9	45.0	4	40.0	6	30.0
Chi value 3.51, df=3 p value=0.319								

Table 1 summarized a total of 59 cases were included in the study: 9 medical, 20 pneumatic dilatation, 10 laparotomy cardiomyotomy, and 20 laparoscopic cardiomyotomy. The mean (±SD) ages were 38.8±8.2 years (medical), 35.2±10.3 years (pneumatic dilatation), 36.4±12.5 years (laparotomy), and 37.6±13.2 years (laparoscopic). Age ranges were 30–58, 15–60, 18–60, and 19–70 years, respectively. The 35–45 age group was predominant in medical, pneumatic dilatation, and laparotomy, while 25–35 years was most common in laparoscopic cases. Age differences were not statistically significant (p>0.05, ANOVA). Gender distribution varied: medical (33.3% male, 66.7% female), pneumatic dilatation (55% male, 45% female), laparotomy (60% male, 40% female), and laparoscopic (70% male, 30% female). No significant gender differences were found (p>0.05, chi-square test).

Table 2: Distribution of the study patients by chief complaints (n=59)

Chief complaints	Medical		Pneumatic Dilatation		Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
	n	%	n	%	n	%	n	%
Dysphagia	9	100.0	20	100.0	10	100.0	20	100.0
Regurgitation	9	100.0	20	100.0	10	100.0	16	80.0
Weight loss	1	11.0	5	25.0	2	10.0	5	25.0

Table 2 shown Dysphagia and regurgitation were more common complaint in all groups of the patients, whereas weight lost was found 1(11.0%) in medical treatment, 5(25.0%) in pneumatic Dilatation 2(10.0%) in Laparotomy Cardiomyotomy and 5(25.0%) in laparoscopic Cardiomyotomy.

Table 3: Distribution of the study patients by duration of dysphagia (n=59)

Dysphagia (years)	Medical		Pneumatic Dilatation		Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
	n	%	n	%	n	%	n	%
<1	0	0.0	2	10.0	6	60.0	2	10.0
1-5	4	44.4	9	45.0	2	20.0	11	55.0
6-10	5	55.6	8	40.0	2	20.0	6	30.0
>10	0	0.0	1	5.0	0	0.0	1	5.0
Mean±SD	5.6±2.7		4.1±3.4		2.0±2.9		3.8±2.9	
Range	(2-9)		(1-13)		(0.3-8)		(1-11)	

Table 3 shown the mean (±SD) duration of dysphagia was 5.6±2.7 years and their ranged from 2 to 9 years in medical treatment group. In pneumatic Dilatation the mean (±SD) duration of dysphagia was 4.1±3.4 years and their ranged from 1 to 13 years. In Laparotomy Cardiomyotomy the mean (±SD) duration of dysphagia was 2.0±2.9 years and their ranged from 0.3 to 8 years. In laparoscopic Cardiomyotomy the mean (±SD) duration of dysphagia was 3.8±2.9 years and their ranged from 1 to 11 years. The mean duration of dysphagia difference was not statistically significant (p>0.05) in the ANOVA test.

Table 4: Distribution of the study patients by weight loss (n=59)

Weight Loss (Kg)	Medical		Pneumatic Dilatation		Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
	n	%	n	%	n	%	n	%
No weight loss	8	88.9	17	85.0	9	90.0	18	90.0
Weight loss 3kg	0	0.0	0	0.0	0	0.0	1	5.0
Weight loss 5kg	1	11.1	3	15.0	1	10.0	1	5.0

Table 4 presented this study was carried out in 59 subjects, out of which 7 cases had weight loss. One patient loss 3 kg and rest six patient's loss 5 kg due to dysphagia.

Table 5: Distribution of the study patients according to diameter of esophagus (n=59)

	Medical		Pneumatic Dilatation		Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
	n	%	n	%	n	%	n	%
Grade I	7	77.8	18	90.0	9	90.0	18	90.0
Grade II	2	22.2	2	10.0	0	0.0	2	10.0
Grade III	0	0.0	0	0.0	0	0.0	0	0.0
Grade IV	0	0.0	0	0.0	0	0.0	0	0.0

Grade I: <4 cm, Grade II: 4-6 cm, Grade III: >6 cm, Grade IV: sigmoid esophagus

Table 5 presented most of the patients had grade I, which were 7(77.8%) in medical treatment group. 18(90.0%) in Pneumatic dilatation, 9(90.0%) in Laparotomy Cardiomyotomy and 18(90.0%) in laparoscopic Cardiomyotomy.

Table 6: Distribution of the study patients according to duration of operation (n=59)

Operation duration	Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
(hours)	n	%	n	%
0.6 – 1.5 hours	1	10.0	14	70.0
2 – 3.5 hours	9	90.0	6	30.0
Mean±SD	2.1±0.8		1.5±0.6	
Range	(1.05-3.5)		(0.60-2.4)	

Table 6 shown the mean (±SD) duration of operation was 2.1±0.8 hours and their ranged from 1.05 to 3.5 hours. In laparoscopic Cardiomyotomy the mean (±SD) duration of operation was 1.5±0.6 hours and their ranged from 0.60 to 2.4 hours. The mean duration of operation difference was statistically significant ($p<0.05$) in unpaired t-test.

Table 7: Distribution of the study patients according to time of oral feeding (n=59)

Oral feeding	Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy		P value
	n	%	n	%	
1st Pod	2	20.0	17	85.0	0.001
2- 4th Pod	8	80.0	3	15.0	
Mean±SD	2.4±1.1		1.3±0.9		0.008S
Rang	(1-4)		(1-4)		

S = significant, P value reached from chi square test

Table 7 shown regarding the oral feeding 2(20.0%) and 17(85.0%) taken during 1st post operative day in Laparotomy Cardiomyotomy and Laparoscopic Cardiomyotomy respectively. During 2 to 4th. Post operative day 8(80.0%) taken oral feeding in Laparotomy Cardiomyotomy and 3(15.0%) in Laparoscopic Cardiomyotomy groups. The difference was statistically significant ($p<0.05$) between two groups in chi square test. The mean (±SD) time of oral feeding was 2.4±1.1 post operative days and their ranged from 1 to 4 days. In laparoscopic Cardiomyotomy the mean (±SD) time of oral feeding was 1.3±0.9 days and their ranged from 1 to 4 days. The mean time of oral feeding difference was statistically significant ($p<0.05$) in unpaired t-test.

Table 8: Distribution of the study patients according to time of discharge (n=59)

Hospital Stay	Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy		P value
(Days)	n	%	n	%	
2-3	1	10.0	10	50.0	
4-6	4	40.0	10	40.0	[a]0.001[S]
7-9	5	50.0	0	10.0	
Mean±SD	5.8±2.3		3.3±0.9		[b]0.001[S]
Range	(3-9)		(2-4)		

S = significant, [a]=P value reached from chi square test, [b]=P value reached from unpaired 't' test

A half of the patients stay hospital 7 to 9 days in Laparotomy Cardiomyotomy, whereas in Laparoscopic Cardiomyotomy a half of the patients stay 2 to 3 days stay. The mean (±SD) duration of hospital stay was 5.8±2.3 days and their ranged from 3 to 9 days. In laparoscopic Cardiomyotomy the mean (±SD) duration of hospital stay was 3.3±0.8 days and their ranged from 2 to 4 days. The mean duration of hospital stay difference was statistically significant ($p<0.05$) in unpaired t-test. The results are shown in the table 8.

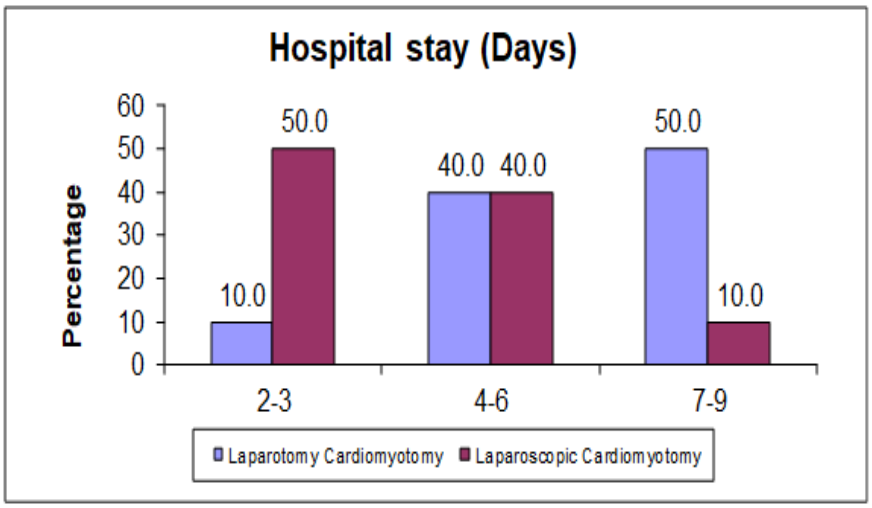

Figure 1: Bar Diagram Showing Distribution of the Study Patients According to Time of Discharge

Table 9: Distribution of the study patients according to complication (n=59)

Complications	Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
	n	%	n	%
Port infection/wound infection	3	30.0	1	5.0
Reflux/heart burn	5	50.0	3	15.0
Mucosal perforation	0	0.0	1	5.0
Surgical emphysema	0	0.0	1	5.0
Stomach perforation	1	10.0	1	5.0
Liver injury	1	10.0	0	0.0

Most of the patients had reflux/heart burn which were 5(50.0%) in Laparotomy Cardiomyotomy and 3(30.0%) in Laparoscopic Cardiomyotomy. Port infection/wound infection was found 3(30.0%) and 1(5.0%) in Laparotomy Cardiomyotomy and Laparoscopic Cardiomyotomy respectively. Others complications are depicted in the above table.

Table 10: Distribution of the study patients according to outcome (n=59)

Outcome	Medical		Pneumatic Dilatation		Laparotomy Cardiomyotomy		Laparoscopic Cardiomyotomy	
	n	%	n	%	n	%	n	%
Satisfactory	0	0.0	3	15.0	6	60.0	15	75.0
Improved	1	11.1	8	40.0	3	30.0	4	20.0
Recurrence	8	88.9	9	45.0	1	10.0	1	5.0

Table 10 shown the outcome most (88.9%) of the patients had recurrence in medical treatment group and 9(45.0%) in pneumatic Dilatation group. In Laparotomy Cardiomyotomy and laparoscopic Cardiomyotomy outcome were satisfactory in 6(60.0%) and 15(75.0%) respectively.

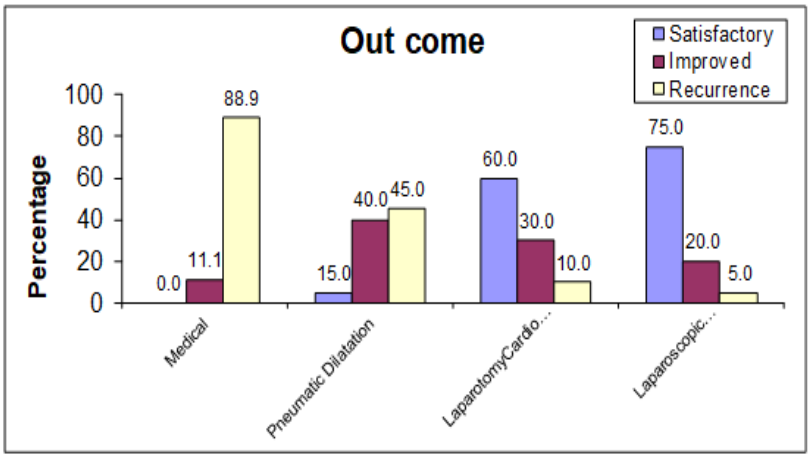

Figure 2: Bar Diagram Showing Distribution of The Study Patients According to Outcome

DISCUSSION

This retrospective study was carried out to review the presentation and diagnosis of achalasia cardia and compared the outcome of different treatment modalities for achalasia cardia. 59 patients who had treatment for achalasia at the Bangabandhu Sheikh Mujib Medical University and other private hospital from January 2004 to December 2009 were included for this study. Out of that 9 had medical treatment, 20 had pneumatic dilatation, 10 had Laparotomy cardiomyotomy and 20 had laparoscopic cardiomyotomy. In this current study the age range was 15 to 60 years, mean (±SD) age was 38.8±8.2 years and their age ranged from 30 to 58 years in medical treatment group. In the pneumatic dilatation the mean (±SD) age was 35.2±10.3 years and their age ranged from 15 to 60 years. In Laparotomy cardiomyotomy group the mean (±SD) age was 36.4±12.5 years and their age ranged from 18 to 60 years. In laparoscopic cardiomyotomy the mean (±SD) age was 37.6±13.2 years and their age ranged from 19 to 70 years. Maximum number was found in the age group of 35 to 45 years in the medical, pneumatic dilatation and Laparotomy cardiomyotomy, however in laparoscopic cardiomyotomy (25-35 years age) patients were habit younger. Aziz, Khan and Alam *et al.* have shown in their series, the mean age of the patients with achalasia was 30.0 years with ranging from 15 to 60 years which is closely resemble with the present study.[10] Similarly, Chowbey *et al.* have observed identical age range (24 years to 52 years) of the patients having achalasia cardia and thus, support the present study.[5] In pneumatic dilatation group 55.0% were male and 45.0% were female; in Laparotomy cardiomyotomy 60.0% male and 40.0% female, in laparoscopic cardiomyotomy 70.0% were male and 30.0% were female and male female ratio was 1.4:1 in the whole study patients. Aziz, Khan and Alam *et al.*observed male female ratio was 1:1.3, which is comparable with the current study.[10] Aziz and Khan *et al.* showed higher incidence in male in another small serious with laparoscopic cardiomyotomy 2006, where they found male female ratio was 4:1.[11] However, Chowbey *et al.* found male female ratio was 1.3:1 similar to the present series.[5]

In this study it was observed that dysphagia and regurgitation were common complaints in all groups of the patients, however weight loss was found 5(25.0%) in pneumatic dilatation, 2(10.0%) in Laparotomy Cardiomyotomy and 5(25.0%) in laparoscopic Cardiomyotomy. Emblem *et al.*, Aziz, Khan and Alam *et al.* have observed identical weight loss, support the present study.[7, 10] It was observed in this present study that the mean (±SD) duration of dysphagia was 4.1±3.4 years and their ranged from 1 to 13 years in pneumatic dilatation group. In the Laparotomy cardiomyotomy the mean (±SD) duration of dysphagia was 2.0±2.9 years and their ranged from 0.3 to 8 years. In laparoscopic cardiomyotomy the mean (±SD) duration of dysphagia was 3.8±2.9 years and their ranged from 1 to 11 years. Aziz, Khan and Alam *et al.* observed the duration of symptom at the presentation ranged from 6 months to 9 years, which is consistent with the present study.[10] Same investigators observed the duration of symptom 2 years to 6 years. Seven patients had weight loss, out of that one patient lost 3 kg and rest six patients lost 5 kg due to dysphagia in this current study. Most 7(77.8%) of the patients had grade I in medical treatment group, 18(90.0%) in pneumatic dilatation, 9(90.0%) in Laparotomy cardiomyotomy and 18(90.0%) in laparoscopic cardiomyotomy. Emblem *et al.* found majority of the patients had grade 3 and 4, which is not synchronized with the current study. Which may due to early diagnosis was done in the present study.[7]

In this study it was found that the mean (±SD) duration of operation was 2.1±0.8 hours and their ranged from 1.05 to 3.5 hours in Laparotomy cardiomyotomy. In laparoscopic cardiomyotomy the mean (±SD) duration of operation was 1.5±0.6 hours and their ranged from 0.40 to 2.4 hours. The mean duration of operation was significantly ($p<0.05$) higher in Laparotomy Cardiomyotomy. Aziz, and Khan[11] observed duration of operation needed 100 minutes to 160 minutes, which is comparable with the present study. On the other hand, Chowbey *et al.* observed a little shorter duration of operation time needed range from 90 to 100 minutes, which is similar to the present study.[5] Duration of operation needed 0.4-1.5 hours in 1(10.0%) and 14(70.0%) of the patients in Laparotomy cardiomyotomy and laparoscopic cardiomyotomy respectively. In Laparotomy cardiomyotomy 9(90.0%) of the patients needed 2.0-3.5 hours, however 6(30.0%) of the patients in laparoscopic cardiomyotomy needed same time, which is also statistically significant ($p<0.05$). Regarding the oral feeding it was found in this study that 2(20.0%) of Laparotomy cardiomyotomy and 17(85.0%) laparoscopic cardiomyotomy tolerated oral feeding on 1st post operative day. During 2 to 4th post operative day 8(80.0%) taken oral feeding in Laparotomy cardiomyotomy and 3(15.0%) in laparoscopic cardiomyotomy groups. The difference was statistically significant ($p<0.05$) between two groups, which indicates that the oral feeding can be started much earlier in laparoscopic cardiomyotomy, which is comparable with Aziz and Khan *et al.*[11] The mean (±SD) time of oral feeding was 2.4±1.1 post operative days and their ranged from 1 to 4 days. In laparoscopic cardiomyotomy the mean (±SD) time of oral feeding was 1.3±0.9 days and their ranged from 1 to 4 days. The mean time of oral feeding difference was significantly ($p<0.05$) higher in Laparotomy cardiomyotomy.

Duration of hospital stay, it was observed that a half of the patients stay hospital 7-9 days in Laparotomy Cardiomyotomy, whereas in Laparoscopic Cardiomyotomy a half of the patients stay 2 -3 days in the current study. The mean (±SD) duration of hospital stay was 5.8±2.3 days with their ranged from 3 to 9 days Laparotomy Cardiomyotomy. In laparoscopic Cardiomyotomy the mean (±SD) duration of hospital stay was 3.3±0.8 days with their ranged from 2 to 4 days. The mean duration of hospital stay difference was significantly ($p<0.05$) higher in Laparotomy cardiomyotomy. Chowbey et al.[5] observed duration of hospital stay ranged from 2 to 4 days which closely resemble with the current study. Endoscopic visualization and air ballooning of the esophagus and stomach in a water pool will show the evidence of mucosal injury. If the hiatal opening is already wide or if crural division is performed to approach the esophagus in the mediastinum, crural repair is performed using nonabsorbable sutures.[8] In this present study it was observed that most of the patients had reflux/heart burn which were 5(50.0%) in Laparotomy Cardiomyotomy and 3(15.0%) in laparoscopic cardiomyotomy. Port infection/wound infection was found 3(30.0%) and

1(5.0%) in Laparotomy cardiomyotomy and laparoscopic lardiomyotomy respectively. Stomach perforation/mucosa perforation was 1(10.0%) and 1(5.0%) in Laparotomy cardiomyotomy and laparoscopic cardiomyotomy respectively. The stomach perforation was repaired by a small incision. Mucosal perforation was 1(5.0%) in laparoscopic cardiomyotomy which was repaired by 3-0 vicryl laparoscopic. One patient had a liver injury in Laparotomy cardiomyotomy. Aziz, Khan, and Alam *et al.* found one patient, who had perforation.[10] Perforation rate varies widely from 0.5% to 9.0%.[12-15] Regarding the outcome of the current study, it was observed that most (88.9%) of the patients had recurrence in the medical treatment group and 9(45.0%) in the pneumatic dilatation group. In the Laparotomy cardiomyotomy group and laparoscopic cardiomyotomy group, satisfactory results were 6(60.0%) and 15(75.0%) respectively. Aziz, Khan and Alam *et al.* found two patients had recurrence.[10]

Limitations of the Study

This study's retrospective design and center setting limit its generalizability and introduce potential selection bias. The small sample size (59 patients) reduces statistical power, and the absence of long-term follow-up prevents assessing treatment durability and recurrence rates. Additionally, esophageal manometry, the gold standard for diagnosis, was not performed, increasing the risk of misclassification. The study also lacked quality-of-life assessments, limiting a comprehensive evaluation of treatment outcomes.

CONCLUSION

The treatment of achalasia focuses on reducing lower esophageal sphincter pressure. Pharmacological options, such as nitrates and calcium channel blockers (e.g., nifedipine), provide temporary symptom relief but have limited long-term efficacy, necessitating further interventions like pneumatic dilatation or surgery. Pneumatic dilation is a cost-effective and safe treatment, with recurrence managed by repeat dilatation or surgery. The initial balloon size (30 mm vs. 35 mm) does not significantly impact outcomes, but a 30 mm balloon is recommended. Surgical options, including laparotomy, thoracotomy, and laparoscopic cardiomyotomy, have comparable efficacy. However, laparoscopic cardiomyotomy is preferred due to shorter hospitalization, reduced pain, and faster recovery, though it requires advanced laparoscopic expertise.

Recommendation

Future studies should adopt a prospective, multicenter approach with larger sample sizes and standardized esophageal manometry for accurate diagnosis. Long-term follow-up is essential to evaluate recurrence and functional outcomes. Comparative studies between laparoscopic cardiomyotomy and emerging endoscopic treatments, such as POEM, should be conducted. Standardized treatment guidelines tailored to the Bangladeshi population should be developed, and patient-reported outcomes should be integrated to assess treatment effectiveness comprehensively.

Funding: No funding sources.

Conflict of Interest: None declared.

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The Journal of Teachers Association
Abbreviated Key Title: TAJ
Official Journal of Teachers Association Rajshahi Medical College