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A PROSPECTIVE OBSERVATIONAL STUDY OF INCIDENCE OF GASTROPARESIS IN PATIENTS UNDERGOING LAPAROSCOPIC CHOLECYSTECTOMY

General Surgery

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ABSTRACT

Background: Gastroparesis is a condition affecting digestion where the stomach's ability to move food along is impaired or non-existent. It is characterized by delayed emptying of the stomach, occurring without any physical blockage within stomach. The aim of this study is to identify the incidence of gastroparesis in patients undergoing laparoscopic cholecystectomy. **Material And Methods:** Patients admitted in the Department of surgery at Bharati Vidyapeeth hospital were included in this study which were undergoing lap cholecystectomy after taking informed consent and ethical clearance. **Results:** A total of 77 patients undergoing laparoscopic cholecystectomy were included in the study. These patients were divided into two groups. Group 1: Consisted of 42 individuals, all of whom (100%) showed no symptoms of gastroparesis. Group 2: Comprised 35 % diabetic patients, with 20 (57%) reporting no symptoms of gastroparesis and 15(43%) showingsymptoms. This indicates a significant prevalence of gastroparesis in Group 2 compared to its complete absence in Group 1. **Conclusion:** In this study of 77 patients, 15 out of 35 diabetic individuals were diagnosed with gastroparesis, characterized by delayed flatus passage and peristalsis. The diagnosis was based on clinical symptoms, supported by upright abdomen X-ray and ultrasonography, without using more invasive methods like gastric scintigraphy. Gastroparesis, often confused with dyspepsia, was identified through non-invasive, cost-effective approaches, avoiding radiation exposure associated with more complex diagnostic techniques.

KEYWORDS

gastroparesis, laparoscopic cholecystectomy

INTRODUCTION:

Gastroparesis is a condition affecting digestion where the stomach's ability to move food along is impaired or non-existent. It is characterized by delayed emptying of the stomach, occurring without any physical blockage within stomach.[1–4] There are numerous factors that can lead to gastroparesis. In 36–49% of patients, the cause is unknown [5], while it appears in 5–12% of patients with Diabetes Mellitus (DM) [6]. Additional factors that can contribute to this condition include infections, diseases affecting connective tissues, autoimmune disorders, neuromuscular issues, and treatments for cancer like radiation and chemotherapy [7]. Gastro- paresis syndrome is a serious complication of DM. The prevalence of gastroparesis in diabetes mellitus is not precisely determined. Some studies report that gastroparesis affects up to 40% of individuals with type 1 diabetes mellitus and 20% of those with type 2 diabetes [8]. However, a more recent study found that gastroparesis occurs in only 5% of type 1 and 1% of type 2 diabetes patients [7]. Gastroparesis is characterized by symptoms such as early satiety, feeling of fullness after eating, retching, regurgitation, and pain in abdomen. These symptoms are not specific and can be present in various gastro-intestinal disorders. Post-surgical gastroparesis can be associated with procedures like cholecystectomy [9,10]

MATERIALS AND METHODS

Method

- **Study Design:** This study was a prospective observation study
- **Place Of Study:** Bharati Vidyapeeth Hospital and Research centre, Pune
- **Duration Of Study:** 24 months, July 2022- July 2024
- **Study Population:** Patients admitted in the Department of surgery at Bharati Vidyapeeth hospital were included in this study after taking informed consent and ethical clearance.
- **Sample Design:** Prospective observation study
- **Sample Size Estimation:** A sample size of 75

Methodology

- The study group comprised of adult patients of both genders who were admitted for laparoscopic cholecystectomy surgery, at Bharati Vidyapeeth Hospital and Research Centre, Pune.
- All included patients were initially subjected to detailed history taking using a specially designed proforma having general information about the patient, symptoms and duration of the particular diagnosis, general examination, systemic examination, random sugar levels, Hba1c levels.
- Whether the patient has

1. Diabetes or not
2. Normal serum electrolytes/ abnormal
3. Duration of dissection
4. Time of ambulation
5. Whether drain is present or absent
6. And other comorbidities present or not

RESULTS

Results:

Grouping:

Table 1: Description of groups

Groups		N	%
Group 1	Normal Patients	42	54.54
Group 2	Patients with Diabetes	35	45.46
Total		77	100.0

The table presents data on two distinct groups within a study population totaling 77 individuals. Group 1 consists of 42 normal patients, making up 54.54% of the study's participants. Group 2 includes 35 patients diagnosed with diabetes, accounting for 45.46% of the total participants. Together, these groups comprise the entire study cohort, summing up to 100%.

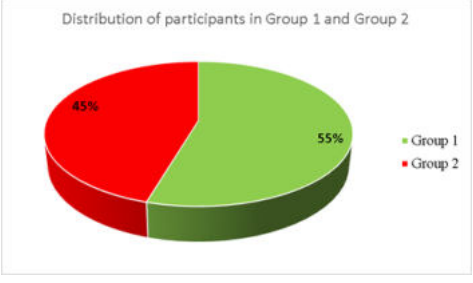

Figure 1: Description of groups

Age:

Table 2: Intergroup comparison of age

Age	Group 1		Group 2		Mean difference	t-value	p-value
	Mean	SD	Mean	SD			
	46.45	15.24	46.14	13.48	0.31	0.094	0.93
Values are presented as mean and standard deviation (SD). Statistical Significance was determined using an independent sample t-test, with a p- value < 0.05 considered significant.							

The table presents comparative data between two groups, illustrating age differences along with standard deviations (SD). Group 1 has a mean age of 46.45 years with a SD of 15.24, while Group 2 shows a mean age of 46.14 years with a SD of 10.413. The average age difference between the two groups is 0.31 years. An independent sample t-test revealed a t- value of 0.094 and p-value of 0.93, suggesting that there is no statistically significant difference between the groups.

This suggests a no significant age disparity between the groups under study.

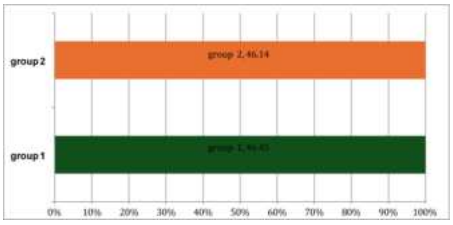

Figure 2: Intergroup comparison of ageGender:

Table 3: Gender Distribution Between Groups

Gender	Group				chi-square value	p-value
	Group 1		Group 2			
	N	%	N	%		
Male	17	40.5%	6	17.1%	4.96	0.03
Female	25	59.5%	29	82.9%		
Values are reported as frequencies and percentages						

Table presents chi-square analysis comparing gender distribution between two groups. In Group 1, there are 17 males (40.5%) and 25 females (59.5%). Conversely, Group 2 consists of 6 males (17.1%) and 29 females (82.9%). The chi-square value calculated for this distribution is 4.96, resulting in a p-value of 0.03. This suggests a statistically significant difference in gender distribution between the two groups, given that the p-value is below 0.05.All values are expressed as frequencies and percentages.

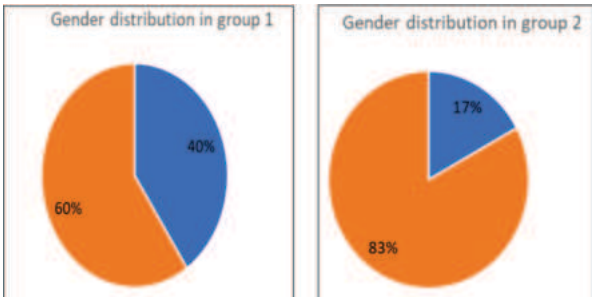

Figure 3: Gender distribution between groups

Table 4: Intergroup comparison of potassium levels

Parameters	Group 1		Group 2		Mean difference	t-value	p-value
	Mean	SD	Mean	SD			
Potassium levels	3.98	0.37	4.06	0.41	0.08	-0.899	0.37
Values are expressed as mean and SD.							

The table presents a comparison of potassium levels between two groups, with values expressed in terms of mean and standard deviation (SD). Group 1 showed a mean potassium level of 3.98 with a standard deviation of 0.37, while Group 2 had a mean of 4.06 with a standard deviation of 0.41. The mean difference between the groups is 0.08. The statistical analysis was performed using an independent sample t-test, yielding a t-value of -0.899. The resulting p-value is 0.37, which indicates that the difference in potassium levels between the two groups is not statistically significant, as it exceeds the conventional threshold of 0.05.

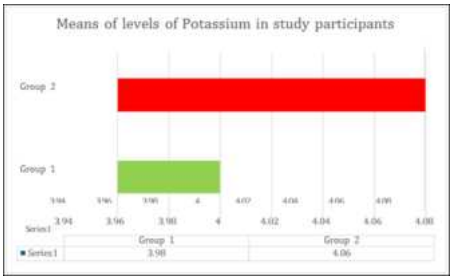

Figure 4 : Intergroup comparison of potassium levels

Ambulation (within 24 hours of surgery):

Table 5: Ambulation within 24 hours of surgery comparison between groups

	Group			
	Group 1		Group 2	
	N	%	N	%
Ambulation (within 24 hours of surgery)	42	55.5%	35	45.5%

The table presents data on ambulation within 24 hours of surgery across two groups, illustrating no significant differences in early mobilization post-surgery

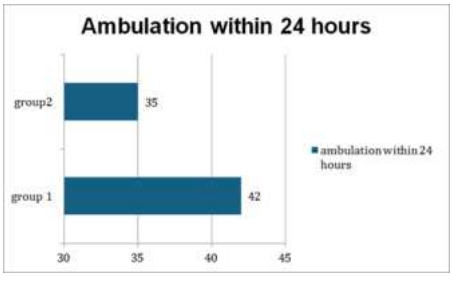

Figure 5: Ambulation within 24 hours of surgery comparison between groups

Passing Flatus:

Table 6: Passing Flatus Comparison Between Groups

PASSING FLATUS		Group				p-value
		Group 1		Group 2		
		N	%	N	%	
Within 12 hours of surgery	No	2	4.8	35	100.0	< 0.001
	Yes	40	95.2	0	0.0	
Within 36 hours	No	40	95.2	15	42.9	< 0.001
	Yes	2	4.8	20	57.1	
Within 48 hours	No	42	100.0	20	57.1	< 0.001
	Yes	0	0.0	15	42.9	

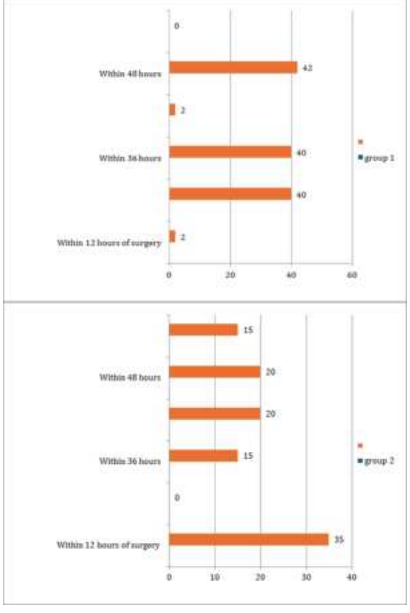

Figure 6: Passing Flatus Comparison Between Groups

The table presents data on the occurrence of passing flatus post-surgery in two different groups at three different time intervals: within 12 hours, 36 hours, and 48 hours. For the first interval (within 12 hours), Group 1 had 95.2% of participants passing flatus compared to 0% in Group 2, yielding a statistically significant p-value of less than 0.001. At 36 hours, the difference between groups was also pronounced, with 4.8% for Group 1 and 57.1% for Group 2, reflected in significant p-value of less than 0.001. By 48 hours, participants in Group 1 (0%) and all in Group 42.9% had passed flatus, resulting in a p-value of less than 0.001, indicating significant difference .

Bowel Sounds Heard:

Table 7: Bowel sounds heard comparison between groups

Bowel Sounds Heard		Group				p-value
		Group 1		Group 2		
		N	%	N	%	
Within 12 hours of surgery	No	2	4.8	35	100.0	< 0.001
	Yes	40	95.2	0	0.0	
Within 36 hours	No	40	95.2	15	42.9	< 0.001
	Yes	2	4.8	20	57.1	
Within 48 hours	No	42	100.0	20	57.1	< 0.001
	Yes	0	0.0	15	42.9	

The table presents the frequency and percentage of bowel sounds heard at different intervals post-surgery across two groups. Within 12 hours of surgery, 4.8% of Group 1 and 100% of Group 2 did not hear bowel sounds yielding a statistically significant p-value of less than 0.001. At 36 hours, the absence of bowel sounds was reported in 95.2% of Group 1 and 42.9% of Group 2, yielding a statistically significant p- value of less than 0.001. By 48 hours, nearly all participants (100% in Group 1 and 57.1% in Group 2) did not hear bowel sounds, yielding a statistically significant p-value of less than 0.001. The data suggests significant variations in the recovery of bowel function within the first 36 hours post-surgery, but also 48 hours.

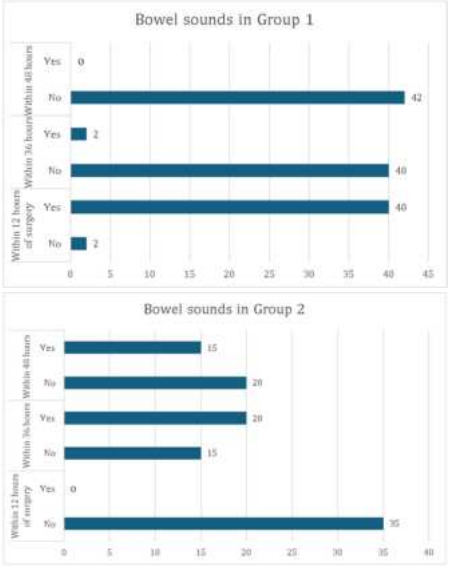

Figure 7: Bowel sounds heard comparison between groups

Gastroparesis:

Table 8: Gastroparesis Comparison Between Groups

Gastroparesis	Group			
	Group 1		Group 2	
	N	%	N	%
No	42	100.0%	20	57%
Yes	0	0.0%	15	43%
Values are expressed as frequency and percentage.				

The table presents a comparative analysis of gastroparesis incidence across two distinct groups. Group 1 consists of 42 individuals, all of whom (100%) reported no symptoms of gastroparesis. Conversely, Group 2 comprises 35 participants, divided into 20 (57%) reporting no symptoms and 15 (43%) affirming symptoms of gastroparesis. These values, represented as frequency and percentages, highlight a significant presence of gastroparesis in Group 2, contrasting starkly with its complete absence in Group 1. This distribution underscores a clear differentiation in the gastroparesis profile between the two groups.

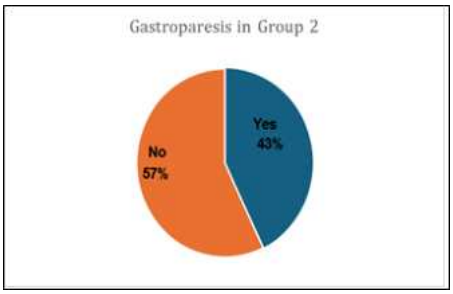

Figure 8: Gastroparesis comparison between groups

DISCUSSION

Gastroparesis is a gastrointestinal disorder with symptoms like nausea, vomiting, early fullness, and indigestion. Research by Jones et al. found that diabetic patients often experience delayed gastric emptying [11] This prospective observational study was conducted at Bharati Vidyapeeth Hospital, focusing on patients undergoing laparoscopic cholecystectomy. Diagnosis of gastroparesis was based on clinical symptoms and confirmed radiologically using ultrasound and upright abdomen X- ray to rule out obstruction.

Abdulrahman Saleh Al-Mulhim's study found that in a study of 462 diabetic patients who had laparoscopic cholecystectomy, 18% experienced the development of gastro-paresis. This rate is lower than the studies by Parkman et al. [12] and Deeb et al.[13] have reported that 36–39% of patients experienced this condition.) but higher than the approximately 8% observed in studies by Soykan et al. [14] where some patients with idiopathic gastroparesis developed symptoms shortly after open cholecystectomy. One study noted that elderly patients exhibited delayed gastric emptying, while another study by Madsen et al. indicated that age does not impact gastric emptying. [15]

Additionally, several studies have observed that over 80% of patients diagnosed with gastroparesis were female. This gender difference may be related to hormonal influences, similar to how gallstone formation predominantly affects females. [16]In our study, we included about 77 patients, of which 35 were diagnosed with diabetes. We noted that 15 diabetic patients experienced delayed peristalsis or bowel movements, but they regained normal bowel function within 48 hours. Gastroparesis diagnosis was established through clinical assessment and radiological examination using upright abdomen X-ray to rule out any bowel obstruction. Henry P. Parkman and colleagues conducted a study to investigate whether the symptoms and "symptoms observed in individuals with gastroparesis" vary between which have undergone "before cholecystectomy" and those "who still have their gallbladder". The study aimed to compare the characteristics and manifestations of gastroparesis in these two groups of patients to understand any potential differences related to gallbladder surgery.

This study indicated that patients with gastroparesis who had undergone prior gallbladder removal experienced more severe symptoms of gastroparesis, specifically increased abdominal pain and episodes of vomiting or retching. These patients also tend to have more additional health issues, including borderline increases in psychological disturbances, higher healthcare utilization, and poorer overall quality of life. These findings suggest a correlation between cholecystectomy and specific symptoms and outcomes related to gastroparesis, highlighting potential implications for clinical management and patient care.

Deeb's study found that cholecystectomy did not lead to clinical improvement in gastroparesis. Additionally, 8% of patients withidiopathic gastro-paresis experienced symptoms of the condition immediately after undergoing open cholecystectomy. This phenomenon was attributed primarily to damage to the vagal nerve, which often occurs during the abdominal exploration involved in open cholecystectomy procedures. [17]

This study revealed that patients with gastroparesis who had previously undergone cholecystectomy experienced higher levels of depression and anxiety compared to those with gastroparesis but no

prior cholecystectomy. Furthermore, the findings suggested that the group of patients with post cholecystectomy gastroparesis reported more instances of pain, including abdominal pain and other types such as fibromyalgia. These observations were likely due to the interconnected nerve pathways between the gallbladder and the upper digestive system involving Both parasympathetic adrenergic pathways which could have contributed to the exacerbation of symptoms in these patients. [18]

Recent studies indicate that laparoscopic cholecystectomy has been associated with improvements in digestive discomforts including abdominal pain, feeling full quickly, Queasiness and throwing up. However, these studies also suggest that this procedure does not significantly affect gastric emptying rates. In individuals with diabetic gastroparesis specifically, it is observed that gallbladder emptying is slowest in individuals with concurrent autonomic neuropathy. This highlights the complex interplay between surgical interventions, gastrointestinal function, and diabetic complications affecting nerve function. [19][20] Patients who develop gastroparesis after cholecystectomy tend to use healthcare services more frequently and report poorer quality of life. These findings indicate that previous gallbladder removal is linked to specific symptoms and outcomeassociated with gastroparesis. This suggests that undergoing cholecystectomy may influence the development and severity of gastroparesis-related manifestations, impacting overall healthcare needs and patient well-being.

CONCLUSION

In this study of 77 patients, 15 out of 35 diabetic individuals were diagnosed with gastroparesis, defined as delayed passage of flatus and return of peristalsis. The diagnosis was based on clinical symptoms and supported by upright abdomen X-ray and ultrasonography, excluding mechanical obstructions. Unlike previous studies using methods like gastric scintigraphy or breath tests, our approach was non-invasive, low-cost, and avoided radiation exposure. Gastroparesis, which affects the upper gastrointestinal tract, can be difficult to distinguish from dyspepsia due to overlapping symptoms.

REFERENCES

1. Kassander P (1958) Asymptomatic gastric retention in diabetics (gastroparesis diabeticorum). Ann Intern Med 48(4):797-812
2. Kravetz RE (1965) Gastroparesis diabeticorum. GastrointestEndosc 12(2):22-24.
3. Malagelada JR, Rees WDW, Mazzotta LJ, Go VLW (1980) Gastric motor abnormalities in diabetic and postvagotomy gastroparesis: effect of metoclopramide and bethanechol. Gastroenterology 78(2):286-293.
4. Hornbuckle KJLB (2000) The diagnosis and work-up of the patient with gastroparesis. J Clin Gastroenterol 30:117-124.
5. Jung HK, Choung RS, Locke GR 3rd, Schleck CD, Zinsmeister AR, Szarka LA et al (2009) The incidence, prevalence, and outcomes of patients with gastroparesis in Olmsted County, Minnesota, from 1996 to 2006. Gastroenterology 136:1225-1233.
6. Maleki D, Locke GR 3rd, Camilleri M, Zinsmeister AR, Yawn BP, Leibson C et al (2000) Gastrointestinal tract symptoms among persons with diabetes mellitus in the community. Arch Intern Med 160:2808.
7. Parkman HP, Camilleri M, Farrugia G, McCallum RW, Bharucha AE, Mayer EA et al (2010) Gastroparesis and functional dyspepsia: excerpts from the AGA/ANMS meeting. Neurogastroenterol Motil 22:113-133.
8. Parkman HP, Hasler WL, Fisher RS (2004) American Gastroenterological Association medical position statement: diagnosis and treatment of gastroparesis. Gastroenterology 127(5):1589-1591.
9. Ibrarullah M, Mittal BR, Agarwal DK, Das BK, Kaushik SP (1994) Gastric emptying in patients with gallstone disease with or without dyspepsia: effect of cholecystectomy. Austr NZ J Surg 64:247-250.
10. Parkman HP, Yates K, Hasler WL, Nguyen L, Pasricha PJ, Snape WJ et al (2013) Cholecystectomy and clinical presentations of gastroparesis. Dig Dis Sci 58(4):1062-1073.
11. Jones KL, Russo A, Stevens JE, Wishart JM, Berry MK, Horowitz M (2001) Predictors of delayed gastric emptying in diabetes. Diabetes Care 24:1264-1269
12. Parkman HP, Yates K, Hasler WL, Nguyen L, Pasricha PJ, Snape WJ et al (2013) Cholecystectomy and clinical presentations of gastroparesis. Dig Dis Sci 58(4):1062-1073.
13. Deeb F, Lacy B, Yoo H, Mitchell A, Ravich W (2001) Gastroparesis: a risk factor for cholecystectomy? Am J Gastroenterol 96:S51-S52.
14. Soykan I, Sivri B, Sarosiek I, Kiernan B, McCallum RW (1998) Demography, clinical characteristics, psychological and abuse profiles, treatment, and long-term follow-up of patients with gastroparesis. Dig Dis Sci 43:2398-2404
15. Madsen JL, Graff J (2004) Effects of ageing on GI motor function. Age Ageing 33:154-159
16. Borg J, Melander O, Johansson L, Uvna"s-Moberg K, Rehfeld JF, Ohlsson B (2009) Gastroparesis is associated with oxytocin deficiency, oesophageal dysmotility with hyperCCKemia, andautonomic neuropathy with hypergastrinemia. BMC Gastroenterol 9:17
17. Soykan I, Sivri B, Sarosiek I, et al. Demography, clinical characteristics, psychological and abuse profiles, treatment, and longterm follow-up of patients with gastroparesis. Dig Dis Sci. 1998; 43:23982404.
18. Kennedy AL, Saccone GT, Mawe GM. Direct neuronal interactions between the duodenum and the sphincter of Oddi. Curr Gastroenterol Rep. 2000;2:104-111.
19. Vignolo MC, Savassi-Rocha PR, Coelho LG, et al. Gastric emptying before and after cholecystectomy in patients with choleystolithiasis. Hepatogastroenterology. 2008;55:850- 854.
20. Brugstaller M, Barthel S, Kasper H. Diabetic gastroparesis and gallbladder disease. Ultrasound diagnosis after multiple-component meals.Dtsch Med Wochenschr. 1992;117:1868-73.32.