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PREVALENCE, RISK FACTORS AND MANAGEMENT OF PARALYTIC ILEUS AMONG PATIENTS IN SAUDI ARABIA: SYSTEMATIC REVIEW

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Review Article

ABSTRACT

Introduction: When the bowel's motor activity is compromised, a condition known as paralytic ileus occurs. This condition is typically unrelated to a mechanical issue. Despite the possibility of self-limitation, the condition is dangerous and, if left untreated for a long period of time, will cause mortality in a manner similar to acute mechanical obstruction. Knowing the most likely etiology and the likelihood that the condition can be managed without surgery are key factors in paralytic ileus management.
Methodology: PubMed, Web of Science, Science Direct, EBSCO, and Cochrane library were searched. Study articles were screened by title and abstract using Rayyan QCRI then a full-text assessment was implemented.

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Results: A total of 5 studies with both sex and random age patients diagnosed with paralytic ileus were included in this review; more than half were males.
Conclusion: There is a lack of literature on paralytic ileus prevalence and risk factors among saudi patients. One of the obstacles to improving the fight against POI is the lack of consensus on its definition, making the literature non comparable. While the majority of measures aim more at the prevention of POI than its treatment, it is logical to think that, just as with gum chewing, patient "prehabilitation" could improve the effectiveness of prevention.

Keywords: Paralytic ileus; post-operative ileus; intestinal obstruction; intestinal motility.

1. INTRODUCTION

The disorder known as paralytic ileus affects the motor function of the colon, typically without a physical obstruction. It develops as a result of myenteric (Auerbach's) and submucous (Meissner's) plexus-related neuromuscular failure, which prevents the transmission of peristaltic waves through the intestine, creating a functional obstruction and allowing fluid and gas to build up in the intestine. The resultant stasis causes the intestine to fill up with fluid and gas, which causes distension, vomiting, a decrease in bowel sounds, and complete constipation.

This study aims to identify the prevalence, risk factors and management of paralytic ileus among patients in the Kingdom of Saudi Arabia.

Common causes of ileus paralyticus include surgical ileus, which goes away in 24 to 48 hours, or hypokalemia brought on by the use of diuretics [1]. Additionally, fractures of the spine or ribs, significant damage beyond the abdomen, the use of a plaster jacket, retroperitoneal trauma, and bleeding are occasionally linked to ileus and it is may be brought on by peritonitis (infection) too. The entire gut may be impacted and may swell to an alarming degree, however; Most commonly affected is the small intestine.

Symptoms of intestinal obstruction (Ileus) include a stop of all motor function. In most cases, There is essentially no colic and little stomach discomfort, but there could be some sensitivity from the distension. Tachycardia from hypovolemia and tachypnea because the diaphragms are being pulled up are possible. If gastric aspiration has not been performed, the absence of bowel sounds, the failure to pass flatus, and the resulting gastric stasis could cause hiccups, discomfort, and facile vomiting. The abdomen is tympanic and distended.

"Depending on the severity of the affection, While stomach and colonic motility recover after a few days, small bowel motility does so within a few hours. although in case of renal failure, hypoproteinemia, hypokalemia, or the intestine is allowed to become noticeably bloated, the period may be prolonged" [2,3].

"A localised loop (sentinel loop) of dilated small bowel makes up a localised ileus. With the ileus in the same anatomical region as the pathology, the appearance is not diagnostic of an intra-abdominal infection but rather a feature of a local irritation like acute pancreatitis. However, in cases of peritonitis, the irritation of the peritoneum in situations like a perforated appendix or from chemical irritation due to leakage of intestinal contents causes the peritoneal cavity to become acutely inflamed with production of an inflammatory exu, Postoperative ileus continues to be a difficult and unpleasant clinical problem for both patients and professionals. Following surgical surgery, it is characterised by a transient reduction of gastrointestinal motility caused by non-mechanical factors that encourage inadequate oral intake. In the small bowel, the paralytic state typically lasts from a few hours to 24 hours, in the stomach, it lasts from 24 to 48 hours, and in the colon it lasts from 48 to 72 hours". [4] The extent of POI is greatest (10–30%) after colon and rectal surgery and is correlated with the level of surgical damage. 3 But any kind of surgery, even extraperitoneal surgery, might result in POI. Up to one in eight individuals who have gastrointestinal surgery develop extended postoperative ileus, which causes patient discomfort and extends their stay in the hospital. [5] Paralytic ileus is usually associated with increased postoperative complications in most of cases. [6] The clinical effects of postoperative paralytic ileus are severe, increasing discomfort, catabolism because oral feeding is hampered, immobility, danger of pulmonary problems, and duration of stay in the hospital. Preventing postoperative ileus was identified as a critical and unresolved issue in a 2017 study that included patient and public participation. [7] Even though self-limitation may be possible, the situation is serious and, if untreated for a long time, will result in fatality similarly to acute mechanical obstruction. Identifying the most likely cause of the condition and the chance that it can be treated without surgery are crucial components of managing paralytic ileus.

"Since the disorder is typically self-limiting, treatment is conservative. Recovery is sped up by steps to "defunction" the small bowel through nasogastric decompression and by correcting any fluid or electrolyte imbalances by delivering fluid and nutrients parenterally. Patient should not be obstructed for longer than 48 hours as the prognosis would worsen due to the ensuing local bowel and systemic problems" [3]. Reduced abdominal aspirates, an increase in abdominal girth, and the passage of flatus are signs that function has returned.

2. METHODOLOGY

This systematic review was conducted following the demonstrated guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses, PRISMA).

2.1 Study Design

This was a systematic review.

Study duration: From 1st July to 31st August, 2022.

2.2 Study Condition

This review investigates the published literature on patients with paralytic ileus, its risk factors and also discussed the different ways of management of the cases.

2.3 Search Strategy

A systematic literature search of five major databases, including PubMed, Web of Science, Science Direct, EBSCO, and Cochrane library, was conducted to include the eligible literature. Our search was limited to the English language and was adjusted for each database as required. The eligible studies were determined through the following keywords that were adjusted into Mesh terms in PubMed; "paralytic ileus" "postoperative ileus," "a dynamic ileus," "postoperative intestinal obstruction," "ileum motility," and "intestinal motility." The appropriate keywords were paired with "OR" and "AND" Boolean operators. The search results comprised English, full-text publications, freely available articles, and human trials.

2.4 Selection Criteria

Our review comprised the studies with the following criteria:

- Mainly cohort and retrospective cohort studies and study designs that provided qualitative or quantitative data about the incidence, risk factors and management of paralytic ileus.

Exclusion criteria included the following:

- Studies not conducted in the English language.
- Studies with no free access.

2.5 Data Extraction

To find the duplicate elements in the search strategy results, we employed Rayyan (QCRI). By filtering the combined search results according to a set of inclusion/exclusion criteria, the researchers assessed the adequacy of the titles and abstracts. The entire texts of the papers that met the criteria for inclusion were evaluated by the reviewers. To resolve any discrepancies, the authors had a dialogue. The eligible study was added using a data extraction form that was produced. The study's names, authors, year, design, population, participant count, gender, incidence, paralytic ileus risk variables, and major findings were all extracted by the authors.

2.6 Risk of Bias Assessment

ROBINS-I tool for non-randomized studies was used for qualitative data synthesis to assess the included research quality. The reviewers investigated any inconsistencies in the quality assessment and addressed them.

2.7 Strategy for Data Synthesis

Summary tables with the information gathered from the eligible studies were produced to give a qualitative overview of the included study components and result data. Decisions regarding how to make the most of the data from the included study articles were made after the systematic review's data extraction process was complete. Studies that satisfied the standards for full-text inclusion but did not offer any information on the prevalence, risk factors, or treatment of paralytic ileus were disregarded.

2.8 Limitation

The previous studies done regarding the issue of paralytic ileus, its prevalence, risk factors and management in Saudi Arabia are rare and the topic was not enough previously discussed. We only found 7 studies mentioned the issue of postoperative ileus as one of the common post-operative complications.

3. RESULTS

3.1 Search Results

The systematic search yielded a total of 120 study articles, after which 53 duplicates were eliminated. A screening of the titles and abstracts of 40 papers resulted in the exclusion of 20 investigations. Only seven articles out of the 117 reports that were sought for retrieval were not found. 13 studies were eventually screened for full-text evaluation; 3 studies were disqualified due to incorrect study outcomes, 3 studies were disqualified due to a lack of information on the frequency of epileptic seizures, and 2 studies were disqualified due to the improper population type. This systematic review contained five appropriate study papers.

3.2 Characteristics of the Included Studies

This review covered a total of 5 studies. The main topic of most of these studies was ranging from prevalence, risk factors, management or comparison of general post-operative complications and paralytic ileus was included among them. All the patients diagnosed with paralytic ileus were postoperatively complicated cases neither surgically opened nor laporoscopically, and more than half of them were males. All the included studies were conducted in Saudi Arabia in different districts. We found that laparoscopic approach had less prevalence of post-operative ileus in Nadim Malibary. et al. [11].” The surgical technique employed had a sizable impact on the prevalence of POI and PPOI. Better postoperative mobilisation and tolerance to a regular diet were demonstrated by the laparoscopic method. However, overall issues occurred more frequently with the open strategy” [11].

We also found that paralytic ileus is not the most common cause of intestinal obstruction, although it one of the considered causes according to the studies done by Khayat Meiaad et al. [8] and Mohamed. et al. [12].

4. DISCUSSION

This is the first systematic review to discuss the prevalence, most common risk factors and management of paralytic ileus among Saudi patients and the relationship between baseline demographic or physiological factors and incidence of postoperative ileus in patients undergoing open and laparoscopic surgery. Our review confirms significant heterogeneity in the definition of postoperative ileus used in clinical studies, which limits the synthesis of the published evidence.

The more recent studies had higher quality with larger sample sizes and, therefore, were more reliable in reporting much more accurate data regarding the outcomes on standardized measures.

In Saudi Arabia, the previous studies regarding this topic is rare and not specific, as most of the studies discussed paralytic ileus as a cause of intestinal obstruction or one of the post-operative complications faces the patients and doctor as well. In general, we found that the detected literature on paralytic ileus as an outcome in patients with connection to prevalence and risk factors is much less comprehensive and susceptible to a number of important methodological challenges, including small sample sizes and the limited usage of control groups. Improving our understanding of the prevalence and different causes of paralytic ileus using high-quality methodological approaches founds a research priority.

“A total of 5 studies were included, with some evidence for an association between paralytic ileus and surgical operations. Postoperative ileus is a significant clinical problem. It is perhaps the most common complication following gastrointestinal surgery, occurring in up to one in eight patients, and remains poorly understood”. [13] Post-operative ileus and prolonged post-operative ileus were recorded in Nadim Malibary. Et al. [11] as one of the most common post-operative complications. “There are well-established risk factors and potential modifiable risk factors that affect the incidence of POI and PPOI, including invasive techniques, operative difficulty, perioperative blood loss, and delayed mobilization. They compared the incidence of POI, PPOI, and other postoperative complications between laparoscopic colectomy and open colectomy. The overall incidence reported of POI and PPOI was 4.2% and 15%, respectively. There was a higher incidence of POI in the laparoscopic approach group (7.2% vs. 1.5%, P=0.03); however, the incidence of PPOI was higher in the open approach group (20% vs. 9.1%, P=0.03)” [11].

Table 1. Summary of characteristics of the included studies

Study	Study design	Region	General Objectives	Total Participants	Female (%)	Male (%)	Paralytic ileus patient (%)	Key findings
Khayat Meiaad F.et al. 2014 [8]	retrospective study	Jeddah, Saudi Arabia	to determine the incidence and different causes of intestinal obstruction in adults of this region.	230	42.5	57.5	10.31	Paralytic ileus was found in 10.31% of the participants as a post abdominal surgery complication.
Al Gharbi. A. et al. 2018 [9]	Retrospective study	Hail, Kingdom of Saudi Arabia	To discuss the different clinical presentation and patterns of management of bowel obstruction	92	43.5	56.5		Laparotomy was the most common methods of bowel obstruction management in Northern Saudi Arabia. Many patients with bowel obstruction symptoms can improve without surgical intervention.
Abdulrahman Saleh Al-Mulhim 2014 [10]	descriptive retrospective study	alahsa, Kingdom of Saudi Arabia	to study the causes of intestinal obstruction and the management outcomes in local set up in a secondary care hospital in Eastern Saudi Arabia.	754	46.6	54.4	1.8	In conclusion, Intestinal obstruction is a relatively uncommon disease in Saudi Arabia. The frequency of the causes of obstruction in Saudi Arabia are similar to that seen in other countries in Asia. 1.8% of the cases had normal intestine and the cause of the obstruction was paralytic ileus.
Nadim Malibary,et al. 2021 [11]	Retrospective study	Jeddah, Saudi Arabia	to evaluate the incidence of POI and prolonged postoperative ileus (PPOI) as well as postoperative complication rates between the two different approaches, following colorectal surgery in our	120			incidence of POI and PPOI was 4.2% and 15%, respectively.	The incidence of PPOI was significantly different depending on the surgical approach; however, the laparoscopy group tolerated regular diet earlier and had better outcomes regarding postoperative complications. The laparoscopic approach was associated with earlier ambulation and was more cost-effective based on the length of the hospital stay. Further randomized

Study	Study design	Region	General Objectives	Total Participants	Female (%)	Male (%)	Paralytic ileus patient (%)	Key findings
			institution. This was with a view to assessing the potential contributing factors.					studies are required to confirm superiority of the laparoscopic approach in terms of postoperative recovery.
A Y Mohame et al, 1997 [12]	Retrospective study	KSA, generally	To review the causes and management of intestinal obstruction in Saudi patient	84			9.5	pseudo-obstruction (paralytic ileus) was one of the commonly reported post operative complications in the sample

Previous study conducted in 2013 in Isfahan, Iran, [14] "which exclusively focused on the duration of the operation, rather than the type of surgical approach used have found that the occurrence of ileus is directly associated with the duration of the surgical procedure. Another study that observed 295 patients who underwent laparoscopic colectomy for colorectal cancer, also found that the duration of the operation has little impact on POI and PPOI" [15]. "Some evidence for an association between postoperative ileus and some factors like age, male sex, prior abdominal surgery, obesity and pre-existing respiratory disease is reported previously in a previous systematic review done by MJ Lee". Et al [16], and, as such, these variables should be collected and adjusted for in future studies of postoperative ileus.

Khayat Meiaad F. et al. [8], reported paralytic ileus as a cause of intestinal obstruction in 33 patient out of 320 total patient sample with percentage of (10.31%). They included a sample of mixed male and female patients with male predominant (males were 57.5%, females were 42.5%). Considering the association between sex and paralytic ileus, functional obstruction was reported with higher percentage in males (16.88%) and females (10.63%). These findings were supported by other studies included in the systematic review done by MJ Lee. Et al [16], who mentioned that "male sex is associated with postoperative ileus in five studies and the only factor significantly associated with postoperative ileus on meta-analysis. The observed association may result from increased surgical duration and manipulation of the bowel, owing to increased visceral adiposity or a narrow male pelvis necessitating increased manipulation of bowel to complete an operation. Increasing age is associated with increased postoperative ileus in six studies, which could reflect previously reported delayed baseline colonic transit and increased sensitivity to anaesthetic or opiate analgesia" [17].

A Y Mohamed. Et al. [12], on their retrospective review of 84 cases of intestinal obstruction reported paralytic ileus as the cause of intestinal obstruction in 8 cases (9.5%). The prevalence of paralytic ileus recorded in Saudi Arabia is one of the lowest in the world. The low prevalence of paralytic ileus in Saudi Arabia may be because the non sufficient studies regarding this topic.

"Regarding the risk factors of paralytic ileus, obesity was associated with postoperative ileus in two studies assessed and may reflect increased surgical duration, a higher need for open surgery or increased perioperative anaesthetic or opiate requirement. Finally, three studies reported increased postoperative ileus in patients with baseline respiratory disease, which may reflect a tendency towards greater opiate use in such patients given the fear of postoperative respiratory complications" [16].

Management of paralytic ileus is usually non-surgical, demands patience and helpful management. Important first steps include bowel rest, IV fluid therapy, and, if necessary, nasogastric (NG) decompression. In the past, these treatments were believed to reduce problems and enhance results, however a new evaluation of the research contradicts this belief. As chewing gum activates the cephalocaudal reflex, which encourages peristalsis and reduces inflammation, it appears to be a simple, well-tolerated technique to perhaps treat ileus. [18, 19] Unfortunately, these are our only options for now because pharmacologic treatments haven't worked.

5. CONCLUSIONS

This systematic review detected a lack in the literature on paralytic ileus and its risk factors and prevalence among saudi patients. The demonstrated literature was found to be non-comprehensive. We found that paralytic ileus is one of the causes of intestinal obstruction and post operative complications, which cause prolonged hospitalization and delayed prognosis. Additionally, we reported that In the perioperative management of the surgical patient, paralytic ileus has significant clinical implications. There are well-established risk factors for paralytic ileus. Recognizing the synergistic interaction between the traumatised gut and exogenous endotoxin is crucial for its avoidance. The prevalence of this pathophysiological condition might be reduced by minimally invasive surgery and an improved postoperative recovery programme.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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