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Clinical and laboratory findings in surgical intestinal obstruction in adults

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ABSTRACT

Introduction: Surgical intestinal obstruction is a frequent cause of acute abdomen in emergency services due to its multiple etiologies. It presents variable clinical manifestations and delays in diagnosis. Establishing a diagnosis is crucial to deciding between conservative treatment or surgical resolution. **Objective**: To identify the frequent clinical and laboratory aspects in patients with surgical intestinal obstruction. **Methods**: A clinical records review of patients between 19 and 70 years old admitted to the Regional Hospital of Cobán general surgery emergency service from June 2023 to March 2024 was conducted. Descriptive statistics and the Chi-square test were used to determine significant associations. **Results**: Of the total number of patients, 73% were diagnosed with surgical intestinal obstruction. The most frequent clinical findings included cramping abdominal pain (100%), abdominal distension (87%), leukocytosis >10,000 (87%), vomiting (74.1%), and digital rectal examination without stool (72.2%). Variables such as abdominal distension, absence of gastrointestinal sounds, hypokalemia, and leukocytosis >10,000 were statistically significant ($p<0.05$). **Conclusions**: The identified clinical and laboratory variables are essential for the early diagnosis of surgical intestinal obstruction, especially in resource-limited settings where advanced diagnostic tools are not always available.

Keywords: Intestinal obstruction; Clinical Diagnosis; Early Medical Intervention; Laparotomy.

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Hallazgos clínicos y de laboratorio en obstrucción intestinal quirúrgica en adultos

RESUMEN

Introducción: *La obstrucción intestinal quirúrgica es una causa frecuente de abdomen agudo en los servicios de emergencias, debido a sus múltiples etiologías. Presenta manifestaciones clínicas variables y demora en el diagnóstico. Establecer un diagnóstico es crucial, para decidir entre tratamiento conservador o resolución quirúrgica.* ***Objetivo****: Identificar los aspectos clínicos y de laboratorio frecuentes en pacientes con obstrucción intestinal quirúrgica.* ***Métodos:*** *Se realizó una revisión de expedientes clínicos de pacientes entre 19 a 70 años, ingresados al servicio de emergencia de cirugía general del Hospital Regional de Cobán de Junio 2023 a Marzo 2024. Se utilizo estadística descriptiva y la prueba de Chi-cuadrado para determinar asociaciones significativas.* ***Resultados****: Del total de pacientes, el 73% fueron diagnosticados con obstrucción intestinal quirúrgica. Los hallazgos clínicos más frecuentes incluyeron dolor abdominal tipo cólico (100%), distensión abdominal (87%), leucocitosis >10,000 (87%), vómitos (74,1%) y tacto rectal sin heces (72,2%). Variables como distensión abdominal, ausencia de ruidos gastrointestinales, hipokalemia y leucocitosis >10,000 mostraron significancia estadística (p<0,05).* ***Conclusiones:*** *Las variables clínicas y de laboratorio identificadas son fundamental para el diagnóstico temprano de obstrucción intestinal quirúrgica, en especial en entornos con recursos limitados, donde las herramientas diagnósticas avanzadas no siempre están disponibles.*

Palabras clave: *Obstrucción intestinal; Diagnóstico Clínico; Intervención Médica Temprana; Laparotomía*

Constatations cliniques et de laboratoire dans l'occlusion intestinale chirurgicale chez l'adulte

RÉSUME

Introduction: *L'occlusion intestinale chirurgicale est une cause fréquente d'abdomen aigu aux urgences, en raison de ses étiologies multiples. Elle présente des manifestations cliniques variables et des retards de diagnostic. L'établissement d'un diagnostic est crucial pour décider entre un traitement conservateur ou une résolution chirurgicale.* ***Objectif:*** *Identifier les aspects cliniques et biologiques communs chez les patients présentant une occlusion intestinale chirurgicale.* ***Méthodes:*** *Une revue des dossiers cliniques des patients âgés de 19 à 70 ans, admis au service d'urgence de chirurgie générale de l'hôpital régional de Cobán de juin 2023 à mars 2024, a été réalisée. Des statistiques descriptives et le test du Chi carré ont été utilisés pour déterminer les associations significatives.* ***Résultats:*** *Sur le nombre total de patients, 73 % ont reçu un diagnostic d'occlusion intestinale chirurgicale. Les signes cliniques les plus fréquents comprenaient des crampes abdominales (100 %), une distension abdominale (87 %), une leucocytose > 10 000 (87 %), des vomissements (74,1 %) et un toucher rectal sans selles (72,2 %). Des variables telles que la distension abdominale, l'absence de bruits gastro-intestinaux, l'hypokaliémie et la leucocytose > 10 000 ont montré une signification statistique (p < 0,05).* ***Conclusions:*** *Les variables cliniques et de laboratoire identifiées sont essentielles pour le diagnostic précoce de l'occlusion intestinale chirurgicale, en particulier dans les contextes à ressources limitées où les outils de diagnostic avancés ne sont pas toujours disponibles.*

Mots clés: *Occlusion intestinale; Diagnostic clinique; Intervention médicale précoce; Laparotomie.*

Achados clínicos e laboratoriais em obstrução intestinal cirúrgica em adultos

RESUMO

Introdução: *A obstrução intestinal cirúrgica é uma causa frequente de abdômen agudo nos serviços de emergência, devido às suas múltiplas etiologias. Apresenta manifestações clínicas variáveis e demora no diagnóstico. Estabelecer um diagnóstico é crucial para decidir entre tratamento conservador ou resolução cirúrgica.* ***Objetivo****: Identificar os aspectos clínicos e laboratoriais frequentes em pacientes com obstrução intestinal cirúrgica.* ***Métodos:*** *Foi realizada uma revisão de prontuários clínicos de pacientes entre 19 e 70 anos, internados no serviço de emergência de cirurgia geral do Hospital Regional de Cobán de Junho de 2023 a Março de 2024. Utilizou-se estatística descritiva e o teste do qui-quadrado para determinar associações significativas.* ***Resultados:*** *Do total de pacientes, 73% foram diagnosticados com obstrução intestinal cirúrgica. Os achados clínicos mais frequentes incluíram dor abdominal tipo cólico (100%), distensão abdominal (87%), leucocitose >10.000 (87%), vômitos (74,1%) e toque retal sem fezes (72,2%). Variáveis como distensão abdominal, ausência de ruídos gastrointestinais, hipocalemia e leucocitose >10.000 mostraram significância estatística (p<0,05).* ***Conclusões:*** *As variáveis clínicas e laboratoriais identificadas são fundamentais para o diagnóstico precoce de obstrução intestinal cirúrgica, especialmente em ambientes com recursos limitados, onde ferramentas diagnósticas avançadas nem sempre estão disponíveis.*

Palavras-chave: *Obstrução intestinal; Diagnóstico Clínico; Intervenção Médica Precoce; Laparotomia*

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INTRODUCTION

Surgical intestinal obstruction is a common cause of acute abdomen in hospital emergency departments, attributable to its multiple etiologies. [1] This condition presents variable and diffuse clinical manifestations, which frequently generate delays in diagnosis and, consequently, increase the risk of complications. [2,3] Early diagnosis is essential to determine the course of treatment, whether conservative or surgical, and this decision usually rests at the discretion of the treating surgeon. [1,3-5]

While diagnostic imaging tools are helpful, they have limitations, such as low sensitivity and specificity and the time required to perform them, which can delay timely treatment. [6] Given these limitations, it is essential to identify clinical and laboratory indicators that allow for rapid and accurate diagnosis, especially in settings where advanced diagnostic resources may be limited.

Based on current literature, this study was designed to analyze the most common clinical and laboratory data in patients with surgical intestinal obstruction, providing practical information for medical care in secondary care hospitals. By identifying these factors, we aim to optimize the management of this condition and reduce complications associated with delayed diagnosis and treatment.

METHOD

This quantitative analytical study included 74 patient records of acute cramping abdominal pain who met the inclusion criteria within the specified period. Patients between the ages of 19 and 70 who were admitted to the general surgery emergency department with acute cramping abdominal pain were included. This age group had the highest prevalence of surgical intestinal obstruction. [7] Incomplete or illegible records were excluded.

This study was conducted in a Secondary Care Hospital in Alta Verapaz, Guatemala, and approved by the Teaching and Research Committee of the Health Department of the Cobán Regional Hospital. Data confidentiality was maintained, and the data was used only for research purposes. The results were presented collectively, not individually.

Variables from the patient's medical records were studied, divided as follows: clinical history (gender, surgical history, hernia history, age), clinical symptoms and signs (colicky abdominal pain, abdominal distension, vomiting, bowel movements), physical examination (hypotension, tachycardia, gastrointestinal sounds, digital rectal examination), and laboratory tests (CRP, serum potassium abnormalities, elevated BUN/creatinine, leukocytosis) for each patient. For some analyses, inherently continuous variables, such as age, CRP, serum potassium abnormalities, and BUN/creatinine, were categorized into specific ranges to facilitate interpretation and comparison between groups. In contrast, laboratory variables were classified as elevated or not elevated according to established reference values.

All procedures and analyses complied with the ethical principles of confidentiality and respect for patient rights, ensuring strict adherence to the standards established by the Declaration of Helsinki.

Data were tabulated using IBM SPSS 25, separating patients into two groups: those diagnosed with intestinal obstruction who underwent surgical treatment and those with a different diagnosis who underwent medical treatment. Absolute and relative frequencies of the variables were calculated to facilitate data interpretation. The chi-square test was applied to assess the independence of the variables; a p-value <0.05 was considered statistically significant, indicating that the distribution of the variable differed significantly between groups.

RESULTS

Of the 74 patients registered, 54 (73%) had a diagnosis of surgical intestinal obstruction, and 20 had a diagnosis other than intestinal obstruction. The variables measured in clinical history, signs and symptoms, physical examination, and laboratory results were as follows.

Medical History

Regarding gender, 58.1% of patients were men and 41.9% women. Among patients with intestinal obstruction, 57.4% were men and 42.6% were women. The proportion of patients with intestinal obstruction was similar in both genders, representing approximately 73% within each group. Patients without intestinal obstruction accounted for 27% of the total. See Table 1.

Regarding surgical history, 74.3% of patients had no history of surgery, while 25.7% did. Among patients with intestinal obstruction, 79.6% had no history of surgery, compared to 20.4% who did. The proportion of intestinal obstruction was higher in patients without a history of surgery (78.2%) than those with a history (57.9%). See Table 1.

Regarding hernia history, 73% of patients did not have one, while 27% did. Among patients with

intestinal obstruction, 64.8% did not have a hernia history, while 35.2% did. The proportion of intestinal obstruction was higher in patients without a hernia history (76.1%) than those with a hernia history (67.9%). See Table 1.

The 19 to 30-year-old group accounted for the most significant number of patients, accounting for 40.5%, of whom 40.7% had intestinal obstruction. This was followed by the 31 to 40-year-old group, which represented 21.6%, with 24.6% of patients with intestinal obstruction within this group. Starting at age 41, the proportion of patients progressively decreased in older age groups. The 41 to 50-year-old group was the most prevalent, accounting for 14.9% of the cases, and among them, 10.8% of patients with intestinal obstruction. The highest proportion of patients was observed in the 19 to 30-year-old age group, representing 40.5%. See Table 1.

Table 1. Clinical History Variables According to the Presence of Intestinal Obstruction.

Treatment Variable	Surgical (n=54)	Non-surgical (n=20)	p
Gender			0,841
Male	31(57.4%)	12 (60%)	
Female	23 (42.6%)	8 (40%)	
Surgical History			0,086
Yes	11 (20.4%)	8 (40%)	
No	43 (79.6%)	12 (60%)	
Hernia History			0,439
Yes	19 (35.2%)	9 (45%)	
No	35 (64.8%)	11 (55%)	
Age			0,841
19 to 30 years old	22 (40.7%)	8 (40%)	
31 to 40 years old	13 (24.1%)	3 (15%)	
41 to 50 years old	8 (14.8%)	3 (15%)	
51 to 60 years old	6 (11.1%)	4 (20%)	
61 to 70 years old	5 (10%)	2 (10%)	

Signs and Symptoms

62.2% of patients had no bowel movements, while 37.8% did. Among patients with intestinal obstruction, 68.5% had no bowel movements, and 31.5% did. The proportion of intestinal obstruction was significantly higher in those without bowel movements (80.4%) than those with bowel movements (60.7%). See Table 2.

Colicky abdominal pain, used as an inclusion criterion, was present in 100% of patients, with no differences between groups.

Regarding vomiting, 66.2% of patients had vomiting, while 33.8% did not. Among patients with intestinal obstruction, 74.1% had vomiting, compared to 25.9% without. Intestinal obstruction was more common in patients with vomiting (81.6%) than in those without vomiting (56%). See Table 2.

75.7% of patients had abdominal distension, while 24.3% did not. Among patients with intestinal obstruction, 87% had abdominal distension, compared to 13% without. The proportion of intestinal obstruction was significantly higher in those with abdominal distension (83.8%) than those without (39.9%). See Table 2.

Physical Examination

60.8% had no gastrointestinal sounds, 37.8% had increased sounds, and 1.4% had decreased sounds. Among patients with intestinal obstruction, 63% had no gastrointestinal sounds, and 35.2% had increased sounds. This suggests that the absence of gastrointestinal sounds has a higher proportion of intestinal obstruction than those with increased sounds. See Table 3.

71.6% of patients had tachycardia, while 28.4% did not. Among patients with intestinal obstruction, 66.7% had tachycardia, and 33.3% did not. However, intestinal obstruction was higher in patients without tachycardia (85.7%) than those with tachycardia (67.9%). See Table 3.

85.1% did not have hypotension, and 14.9% did. Of the patients with intestinal obstruction, 81.5% did not have hypotension, and 18.5% did. The proportion of intestinal obstruction was higher in those with hypotension (90.9%) than in those without (69.8%). See Table 3.

59.5% did not have stool on digital rectal examination, while 40.5% did. Among patients with intestinal obstruction, 72.2% did not have stool and 27.8% did. The proportion of intestinal obstruction was considerably higher in those without stool (88.6%) than in those without stool (50%). See Table 3.

Table 2. Signs and Symptoms Variables According to the Presence of Intestinal Obstruction.

Treatment / Variable	Surgical (n=54)	Non-surgical (n=20)	p
Absence of Stools			0,064
Yes	17 (31.5%)	11 (55%)	
No	37 (68.5%)	9 (45%)	
Crampy abdominal pain			0,000
Yes	20 (100%)	54 (100%)	
No			
Vomiting			0,019
Yes	40 (74.2%)	9 (45%)	
No	14 (25.9%)	11 (55%)	
Abdominal distension			0,001
Yes	47(87%)	9 (45%)	
No	7 (13%)	11 (55%)	

Table 3. Physical examination variables according to the presence of intestinal obstruction.

Treatment / Variable	Surgical (n=54)	Non-surgical (n=20)	p
Gastrointestinal noises			0,000
Increased	19 (35.2%)	9 (45%)	
Noiseless	34 (63%)	11 (55%)	
Disabled	1 (1.9%)	0	
Digital Rectal Exam			0,008
With feces	15 (27.8%)	15 (75%)	
No stool	39 (72.2%)	5 (15%)	
Tachycardia			0,120
Yes	36 (66.7%)	17 (85%)	
No	18 (33.3%)	3 (15%)	
Hypotension			0,147
Yes	10 (18.5%)	1 (5%)	
No	44 (81.5%)	19 (95%)	

Laboratories

64.9% of patients had elevated CRP levels, while 35.1% did not. Of patients with intestinal obstruction, 63% had elevated CRP compared to 37% without. The proportion of intestinal obstruction was higher in patients without elevated CRP (76.9%) than in those without (70.8%). See Table 4.

59.5% of patients had elevated BUN/creatinine, while 40.5% did not. Among patients with intestinal obstruction, 53.7% had elevated BUN/creatinine, while 46.3% did not. The proportion of intestinal obstruction was higher in patients without elevated BUN/creatinine (83.3%) than in those with elevated BUN/creatinine (65.9%). See Table 4.

78.4% of patients had leukocytosis (>10,000), while 21.6% did not. Among patients with intestinal obstruction, 87% had leukocytosis, and 13% did not. The proportion of intestinal obstruction was higher in patients with leukocytosis (81%) than those without (43.8%). See Table 4.

63.5% of patients had hypokalemia, 24.3% had normal potassium levels, and 12.2% had hyperkalemia. Of patients with intestinal obstruction, 68.5% had hypokalemia, 16.7% had normal potassium levels, and 14.8% had hyperkalemia. The proportion was higher in patients with hyperkalemia (88.9%) compared to those with hypokalemia (78.7%) and normal potassium levels (60%). See Table 4.

Analysis using the chi-square test showed significant associations between some clinical and laboratory variables and the type of treatment in patients with intestinal obstruction. Statistically significant associations (p<0.05; 95% CI) were observed in colicky abdominal pain, abdominal distension, vomiting, absence of gastrointestinal sounds, digital rectal examination without stool, hypokalemia, and leukocytosis >10,000. No significant associations (p>0.05; 95% CI) were observed in variables such as history of surgery, hernia, gender, absence of bowel movements, tachycardia, hypotension, patient age, elevated CRP, and elevated BUN/creatinine. See Table 1,2,3,4.

Table 4. Laboratory variables according to the presence of intestinal obstruction.

Variable \ Treatment	Surgical (n=54)	Non-surgical (n=20)	p
PCR(>10mg/L)			0,573
Not elevated	20 (37%)	6 (30%)	
Elevated	34 (63%)	14 (70%)	
BUN/Elevated creatinine			0,098
No	25 (46.3%)	5 (25%)	
Yes	29(53.7%)	15 (75%)	
Serum Potassium Abnormalities			0,034
Hyperkalemia (>5mEq/L)	8 (5%)	1(14.8%)	
Hypokalemia (<3.5 mEq/L)	37 (50%)	10 (68.5%)	
Normal (3.5-5 mEq/L)	9 (45%)	9 (16.7%)	
Leukocytosis >10,000			0,003
Yes	47 (87%)	11 (55%)	
No	7 (13%)	9 (45%)	

DISCUSSION

The results of this study describe the most common clinical and laboratory findings in patients with intestinal obstruction treated surgically. Four clinical history characteristics, four signs and symptoms, four physical examination characteristics, and four laboratory parameters described as most prevalent according to current literature on this pathology were evaluated.

Statistical analysis using the chi-square test identified significance in abdominal distension, cramping pain, absence of gastrointestinal sounds, and leukocytosis, with a statistical value of p < 0.05 (95% CI). These data were similar to those reported by Schulwold in 2023, where the clinical characteristics evaluated showed significance values using the chi-square and Fisher tests (p < 0.05; 95% CI). [6] Eskelinen et al. in 2021 also highlighted similar variables, evaluated using logistic regression analysis, with statistically significant results (p<0.05; 95% CI). [3] Schwenter in 2010 highlights leukocytosis >10,000 and abdominal pain in his variables analyzed by Chi-Square being statistically significant (p<0.05; 95% CI). [7] Bouassida and other authors in 2020 identified six independent predictive factors, including leukocytosis >10,000 and colic-type pain evaluated with Chi-square tests, which were statistically significant (p<0.05; IC95). [8]

On the other hand, although vomiting was statistically significant in this study, it differs from what Huang reported in 2018, who analyzed symptoms such as vomiting, fever, and heart rate using univariate logistic regression without finding statistical significance (p>0.05; 95% CI).[9] Furthermore, hypokalemia was not evaluated in previous studies; its inclusion in this analysis reinforces the importance of considering parameters frequently associated with surgical intestinal obstruction, highlighting the need for a multidimensional approach to managing this condition.

It is important to note that variables such as history of hernia, surgery, CPA, and age were not statistically significant in this study, which is consistent with previous research.[3,6] The limited population size and retrospective approach represent substantial limitations. However, these clinically relevant variables provide accessible diagnostic and therapeutic decision-making data.

Several authors [10-17] highlight, as in this analysis, the importance of early diagnosis and timely treatment of surgical intestinal obstruction.

CONCLUSIONS

It was observed that although some variables such as gender, hernia history, surgical history, absence of bowel movements, tachycardia, hypotension, and elevated BUN/creatinine levels were reported

infrequently, they did not show statistical significance in the diagnosis of this pathology.

In contrast, a statistically significant association was found between the presence of surgical intestinal obstruction and cramping abdominal pain, abdominal distension, vomiting, absence of gastrointestinal sounds, rectal examination without stool, hypokalemia, and leukocytosis, highlighting their importance in clinical evaluation.

These results underscore the importance of clinical features and laboratory parameters in the early diagnostic guidance of intestinal obstruction, especially in hospital settings with limited resources, where advanced diagnostic tools may be inaccessible or difficult to implement.

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Conflict of interest
The authors declare no conflicts of interest.

Authorship contribution
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