ORIGINAL ARTICLE

Positive Predictive Value of CT Scan in Detecting Bowel Ischemia in Adhesive Small Bowel Obstruction Taking Operative Findings as Gold Standard

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ABSTRACT

Aim: To determine positive predictive value of computed tomography scan in detecting bowel ischemia in adhesive small bowel obstruction taking operative findings as gold standard.

Methods: This cross sectional study was comprised 170 cases and conducted at department of Surgery Jinnah Hospital Lahore over a period 6 months from 21-07-2015 to 20-12-2015. All patients with diagnosis of Adhesive small bowel obstruction were included. After taking the informed consent patients were advised computed tomography scan with IV and oral water soluble contrast along with baseline investigations findings of bowel ischemia were noted and reported by consultant radiologist. Instead of routine conservative management, early surgical intervention by laparotomy was carried out on the basis of computed tomography scan finding of ischemia by 4th year postgraduate resident under consultant's supervision. Operative finding of bowel ischemia during laparotomy was noted.

Results: Mean age of patients was 38.75±11.44 years. Positive predictive value of computed tomography in detecting bowel ischemia in adhesive small bowel obstruction was 91.2% and on computed tomography scan, bowel ischemia was seen in 155 patients.

Conclusion: Computed tomography can efficiently diagnose the cases of bowel ischemia in adhesive small bowel obstruction.

Keywords: Bowel ischemia, Adhesive small bowel obstruction, Positive predictive value

INTRODUCTION

Small bowel obstruction is an acute surgical problem, commonly caused by adhesions.[1] Adhesive small bowel obstruction (ASBO) is managed appropriately with the help proper diagnostic and therapeutic procedures[2].

Positive findings on clinical examination and dilated gut loops on plain abdominal radiograph helps to reach a diagnosis[3] and is usually managed non-operatively primarily[4], but early surgical intervention which is a life-saving procedure for some patients, is most of the times delayed adhering to usual principles of conservative management resulting in bowel ischemia secondary to dilatation of gut due to luminal contents and local pressure on the mesentery. At present, the reference diagnostic modality for intestinal ischemia is contrast-enhanced CT scan[5,6]. Despite of conflict on validity of this diagnostic tool in current evidences, its usage to diagnose the cause and site of obstruction is climbing up[4,6].

In one study diagnostic accuracy of CT scan for intestinal ischemia came out about 81.7% (49/60)[7] while in second study a defect in vascularization of the small bowel on CT-scan could only be detected in 14% (5/36) patients[4]. Length of conservative treatment and appropriate timing for surgery is completely dependent on the signs of bowel ischemia[8]. Morbidity and mortality associated with fatal consequences may significantly rise if surgical intervention is delayed[9].

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MATERIALS AND METHODS

This cross sectional study was comprised 170 cases and conducted at department of Surgery Jinnah Hospital Lahore over a period 6 months from 21-07-2015 to 20-12-2015. Both male and female, age from 18-60 years, diagnosed cases of Adhesive small bowel obstruction by history of previous surgery and clinical examination and cases which show findings of bowel ischemia on Computed tomography scan were included. Patients with suspicion of abdominal cancers e.g. colorectal, ovarian, hepatocellular on clinical and laboratory examination, history of laparotomy/surgery for previous Adhesive small bowel obstruction, history of allergy to water soluble contrast media (gastrograffin) and suspicion of abdominal tuberculosis determined by history of contact or pulmonary tuberculosis with gradual onset of abdominal symptoms were excluded.

All patients presenting to surgical emergency with diagnosis of adhesive small bowel obstruction

were evaluated by consultant were included. Patients were advised computed tomography (CT) scan with IV and oral water soluble contrast along with baseline investigations that include CBC, serum creatinine, blood urea, HBsAg, Anti HCV and findings of bowel ischemia were noted and reported by consultant radiologist. Instead of routine conservative management, early surgical intervention by laparotomy was carried out on the basis of computed tomography scan finding of ischemia by 4th year postgraduate resident under consultant's supervision. Operative finding of bowel ischemia during laparotomy was noted. Collected data was entered and analyzed in the SPSS-17. The descriptive statistics as age was presented in the form of mean±standard deviation while per operative and on CT scan presence of bowel ischemia as frequency and percentage.

RESULTS

There were 44 patients between 20-40 years and 126 patients between 41-60 years with mean age was 38.75±11.44 years (Table1)*.* According to gender, 113(66.5%) were males and 47(33.3%) were females with male to female ratio was 2.4:1 (Table 2). On computed tomography bowel ischemia was seen in 155 patients (91.2%) while in remaining 15 patients (8.8%) bowel ischemia was not seen on CT-scan (Table 3).

Table 1: Age distribution of patients (n= 170)

Age (years)	n	%
20 – 40	44	25.8
41 – 60	126	74.2

Table 2: Gender distribution of patients (n = 170)

Age (years)	n	%
Male	113	66.5
Female	47	33.5

Table 3: Positive predictive value of CT-scan in detecting bowel ischemia in adhesive small bowel obstruction

Bowel ischemia	n	%
Yes	155	91.2
No	15	8.8

DISCUSSION

Mechanical small-bowel obstruction is a common problem which contributes 4% of admissions and 20% of surgical interventions performed in emergency department in patients with abdominal pain.[10,11] Computed tomography (CT) helps to obtain answers to the four main questions that dictate the management strategy.[11,12] Is mechanical obstruction present? Where is the obstruction located? What is causing the obstruction? Is there any evidence of bowel wall ischemia? The answer to the last question is crucial, as bowel-wall ischemia is associated with a 30% mortality rate, compared with 3% in mechanical SBO without ischemia[13,14].

One of the most important role of Abdominopelvic CT in patients with bowel obstruction is to delineate the difference between simple and complicated obstruction, for example closed loop obstruction or strangulation. Decreased or no contrast enhancement on Abdominopelvic CT is the most specific finding among many, described for detecting ischemia in intestine.[15-17] Many studies describe that the CT findings suggesting bowel ischemia individually are less sensitive but that a combination of CT findings increases the validity of CT in diagnosing intestinal ischemia[12,17,18].

In the present study positive predictive value of computed tomography scan in detecting bowel ischemia in adhesive small bowel obstruction (ASBO) was 91.2%. It means out of 170 patients CT correctly diagnosed bowel ischemia in adhesive small bowel obstruction (ASBO) among 155 patients. Findings of this study is consistent with the positive predictive value reported by Jang[7] in his study which was 80.5% however in the present study positive predictive value was 91.2% which was higher than that of reported by Jang[7] but still showing the high positive predictive value of CT for diagnosing bowel ischemia. Sensitivity of CT in detecting mesenteric ischemia is described almost 90% in many recent studies[19,20].

Patients with Adhesive small bowel obstruction (ASBO) can be benefited with proper management resulting in an excellent outcome only in the presence of an early and exact diagnosis. CT has gained an important and leading position due to its high diagnostic ability in modern advance technology. Technically proper CT examination aided with mastering interpretation of images is necessary to reach a correct diagnosis. As there is a list of causes of acute mesenteric ischemia, therefore CT findings are also different according to the cause, underlying pathophysiology and associated complications.

CONCLUSION

Computed tomography can efficiently diagnose the cases of bowel ischemia in adhesive small bowel obstruction. These results are very useful for the surgeons to make evidence based decision which ultimately can guide the timely surgical intervention for patients resulting in reduce morbidity and mortality.

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