

# Utility of small bowel feces sign and string of beads sign in diagnosing small bowel obstruction

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## Abstract

CT has an important role in the workup and treatment of patients with small bowel obstruction. The diagnosis of small bowel obstruction on C.T is made when there is a discrepancy between the calibers of proximal and distal small bowel loops. If a distinct point of transition between the dilated proximal and collapsed distal bowel is detected, the diagnosis is more certain. Two secondary signs that has been reported to be helpful in confirming small bowel obstruction is the “small-bowel feces” sign and “string of beads” sign. This study was done to assess the role of these “small-bowel feces” sign and “string of beads sign” in the diagnosis of clinically suspected small-bowel obstruction. We assessed 62 patients in the study who were suspected to have intestinal obstruction and was referred for CT scan of the abdomen. Of the 62 patients 34 had small bowel obstruction and 28 had no obstruction. 10 of them had small bowel feces sign and it was absent in the remaining 24.8 of them had string of beads sign and it was absent in the remaining 26. All those who had the above mentioned signs had small bowel obstruction on laparotomy suggesting a specificity of 100 %. However sensitivity was only 29% for small bowel feces sign and 23.5% for string of beads sign, indicating that these signs are not very sensitive for obstruction, but when present they are very specific.

**Key Word:** bowel feces, bowel obstruction.

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## INTRODUCTION

The small bowel feces sign is present when gas bubbles mixed with intra luminal particulate like material is identified in the dilated small bowel.<sup>1</sup> It is the result of delayed intestinal transit allowing more time for increased water absorption from the small bowel contents and by accumulation of incompletely digested food and bacterial overgrowth. The string of pearls sign is seen on lateral decubitus or erect abdominal radiographs, when small bubbles of gas are trapped between the valvulae conniventes.<sup>2</sup> Maglante *et al* found similar accuracies with computed tomography in the detection of small bowel obstruction, but added that CT more frequently enables identification of the cause of obstruction and can provide additional information that is

helpful in addressing patient treatment issues.<sup>3</sup> These two signs are said to be useful in diagnosing obstruction on CT.

## MATERIALS AND METHODOLOGY

This is a prospective study done on 62 patients who were suspected to have intestinal obstruction and was referred for CT scan of the abdomen to the Department of Radio Diagnosis at our hospital. The study was conducted for a period of 2 years starting from June 2013 to June 2015. CT examinations were done on GE Bright Speed multidetector 16 slice CT. Contrast was administered using bolus tracking technique. All patients were given intravenous contrast agent, 80-100 ml of iodinated water-soluble non-ionic contrast medium (1-1.5ml/kg wt.), by a power injector. Inj. Ultravist or Omnipaque (300 mg/ml) is used as the iodinated contrast for intravenous injection. Intravenous contrast injection is set at 3-4 ml/sec. Plain and contrast images were acquired at 5mm thickness and 5mm intervals. Thin reconstructions to 1.25 mm thickness were obtained and axial, coronal and sagittal reformatted images were studied. The CT criteria used for diagnosis of mechanical intestinal obstruction: Dilated proximal bowel loops (small bowel > 3 cms) and collapsed / normal distal bowel loops along with identification of transition point. CT findings were correlated against laparotomy findings. Wherever conservative management

was employed, complete recovery from the symptoms of obstruction at time of discharge was taken as final evidence of no mechanical obstruction. The results are analyzed using standard statistical methodology and sensitivity, specificity, positive predictive and negative predictive value and accuracy were calculated.

### RESULTS AND CONCLUSION

**Table 1:** Sensitivity and specificity of Small Bowel Feces Sign for obstruction

	Final Obstruction		Total
	Present	Absent	
SBFS Present on CT	10	0	10
SBFS Absent on CT	24	28	52
<b>Total</b>	<b>34</b>	<b>28</b>	<b>62</b>

**Table 2:** Small Bowel Feces Sign

	Percent
Sensitivity	29
Specificity	100

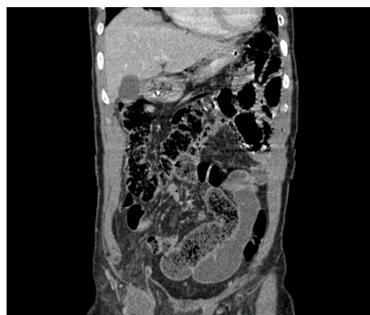
Positive predictive value	100
Negative predictive value	53.8
Accuracy	62

**Table 3:** Sensitivity and specificity of string of beads sign for obstruction

	Final Obstruction		Total
	Present	Absent	
	SBFS Present on CT	08	
SBFS Absent on CT	26	28	54
<b>Total</b>	<b>34</b>	<b>28</b>	<b>62</b>

**Table 4:** String of beads sign

	Percent
Sensitivity	23.5
Specificity	100
Positive predictive value	100
Negative predictive value	51.8
Accuracy	58



**Figure 1:** Small bowel feces sign



**Figure 2:** String of beads sign

34 patients had small bowel obstruction out of the 62 patients in the study. Among them 10 had small bowel feces sign and it was absent in the remaining 24. String of beads sign was present in 8 and it was absent in the remaining 26. All the patients with either of the signs were found to have small bowel obstruction on laparotomy. The sensitivity of small bowel feces sign was 29%, specificity was 100 %, positive predictive value was 100 %, negative predictive value was 53.8% and accuracy was 62%. The sensitivity of string of beads sign was

23.5%, specificity was 100%, positive predictive value was 100%, negative predictive value was 51.8% and accuracy was 58%. Thus we concluded that when small bowel feces sign and string of beads sign were alone taken as an indicator for mechanical intestinal obstruction they are not very sensitive for obstruction, but when present they have high specificity and positive predictive value for obstruction.

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