



Secondary Small Bowel Volvulus: Utility of the Whirl Sign on CT

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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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Case Study

ABSTRACT

Small bowel volvulus (SBV) constitutes 1-6% of all small bowel obstructions (SBO) in adults. Clinically it can be difficult to discern whether a SBO is due to SBV hence why imaging is a key aspect of diagnosis. The presence of a whirl sign on computed tomography is a classic sign of SBV. This is a case of a 75 year old man who presented with a small bowel volvulus secondary to adhesions from prior surgery. He underwent a laparotomy with viable bowel and no resection required. The patient had an uneventful recovery and was discharged after 21 days which included a period in the rehabilitation unit.

Keywords: Small bowel volvulus; whirl sign; computed tomography.

1. INTRODUCTION

Vigilance is required to suspect a small bowel volvulus (SBV) as a rare cause for a small bowel obstruction (SBO). It is a twisting of the small bowel around the root of its own mesentery which can lead to a high grade closed loop bowel

obstruction [1]. Clinically it is difficult to discern a SBO caused by SBV therefore imaging is an important diagnostic factor. Presence of the whirl sign is the most common finding on computed tomography (CT) indicating SBV, hence it is important to understand the utility of this sign to ensure timely operation occurs [2].

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We present a case of a SBV with whirl sign on CT.

2. CASE REPORT

A 75 year old Caucasian male was transferred overnight to a regional referral hospital from a peripheral centre with right upper quadrant pain and concern for pneumoperitoneum on chest x-ray as assessed by the referring physician. On further assessment, he was haemodynamically stable with a 2 day history of vomiting & obstipation with elevated inflammatory markers (CRP: 202 mg/L). His medical history included a laparoscopic appendicectomy, cerebrovascular accident, chronic obstructive respiratory disease, rheumatoid arthritis and seizures.

A computed tomography (CT) scan was performed in portal venous phase which showed a closed loop small bowel obstruction secondary to torsion of its mesentery producing a whirl sign in the right side of the abdomen. There was no pneumoperitoneum or any other features of bowel perforation (Fig. 1 & 2). He was admitted under the Acute Surgical Unit and managed supportively with a plan to operate in the morning. As he was a high risk surgical candidate due to his co-morbidities and late arrival to the emergency department, the decision was made to perform his operation as a priority during daylight hours that day. He remained stable overnight with no deterioration.

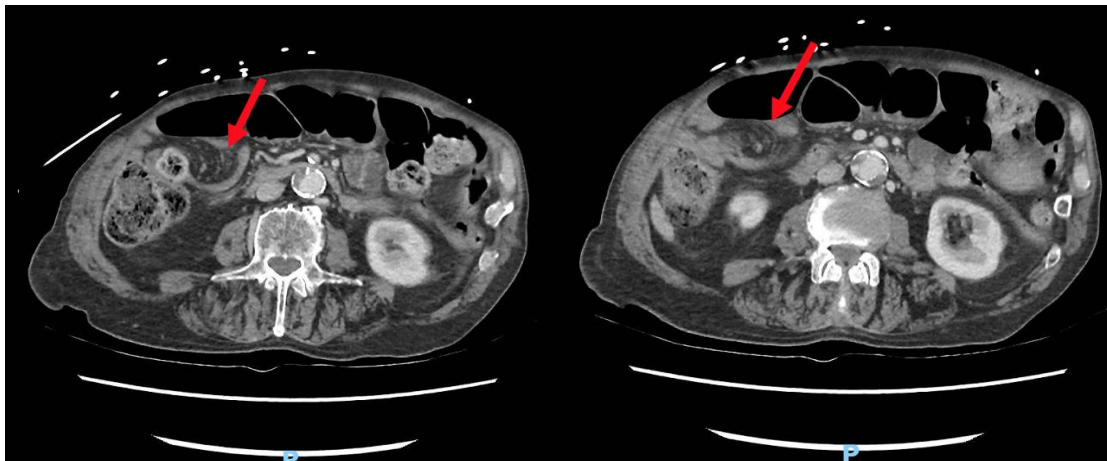


Fig. 1. Axial computed tomography images on presentation with arrows pointing to whirl sign



Fig. 2. Coronal computed tomography image on presentation with an arrow pointing to whirl sign

At laparotomy, a small bowel volvulus from a single band adhesion involving one bowel loop was identified in the right upper quadrant (Fig. 3). There were dilated proximal small bowel loops with no evidence of compromise. All of the small bowel was found to be viable with no resection required and no other pathology was identified. The patient had an uneventful recovery and was discharged on day 21 after a period in the rehabilitation unit.

3. DISCUSSION

Small bowel volvulus (SBV) occurs when small bowel mesentery twists on its root which can cause subsequent compression of vasculature, leading to intestinal obstruction and bowel ischemia. It is particularly rare in adults with an incidence of 1-6% of all SBO and is more common in Africa, Asia, The Middle East and India [1,2]. It is a presentation which requires prompt evaluation due to its high mortality risk [3]. SBV can be classified as primary or secondary according to its cause. A primary SBV is characterised by twisting of the mesentery around its root in a normal abdomen with no underlying anatomical abnormalities or predisposing factors. Secondary SBV is an acquired cause due to adhesions, congenital malrotation, tumours, diverticular disease and pregnancy [1].

Clinically it is difficult to discern whether a SBO is due to SBV, hence why imaging is a key component when deciding on management [4]. The "whirl" sign is a swirl of mesenteric vessels and fat often with surrounding dilated small bowel loops as a result of rotated mesentery. This sign is classically seen on CT in a closed loop SBO can reflect SBV. It can be an important prognostic factor for SBO which can guide clinicians to which presentations require surgical intervention [5]. A patient with whirl sign on CT is 25.3 times more likely to require surgery for SBO than someone without the sign with an 80% positive predictive value and 88% negative predictive value [5].

In our case, CT demonstrated whirl sign which indicated SBV and timely surgical intervention was carried out. Intraoperatively the SBV was classified as secondary due to torsion around a single adhesion. In a review of the literature on SBV, every case required surgical intervention with laparotomy or laparoscopy [1-3,6-9]. Once the diagnosis of SBV is suspected, there is no room to consider conservative management due to potentially compromised vasculature and potential for ischemia and gangrene [1]. Non-operative management is not recommended and should only be considered if the patient is unfit for surgery and carries a high mortality rate [2].



Fig. 3. Intra-operative images of small bowel volvulus. Single loop small bowel volvulus (solid arrow) with dilated proximal and collapsed distal small bowel. Culprit adhesion not seen in image

4. CONCLUSION

This case identifies an uncommon but high acuity cause of SBO which all clinicians should be aware of. Although it presents similar to SBO caused by other conditions, it has potentially fatal outcomes if there is a delay in diagnosis and surgical intervention. The whirl sign is a useful tool to identify potential SBV and thus highlights its important role in assessment and management of patients with SBO.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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