

ORIGINAL PAPERS

Small bowel obstruction due to laparoscopic barbed sutures: An unknown complication?

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ABSTRACT

Background: In recent years there has been an increasing uptake in the use of barbed sutures, particularly in minimally invasive and laparoscopic procedures where they may reduce operating time and improve surgical efficiency. However, little is known about the adverse events associated with these new materials and concerns have arisen regarding their safety in certain procedures.

Methods: We performed a search of electronic databases (PubMed, EMBASE, and Cochrane Database). We reveal up to 15 cases of small bowel obstruction (SBO) complicating laparoscopic pelvic surgery that have been reported to date adding two cases of SBO in our own practice following the use of barbed sutures in laparoscopic operations, both requiring surgical re-intervention in the early post-operative period.

Results: Fifteen similar cases of small bowel obstruction were identified, all of which occurred in patients undergoing surgery below the transverse colon. Surgical re-intervention was required in all cases although 60% of these were performed laparoscopically.

Conclusions: These cases highlight that although barbed sutures provide an attractive means to allow easier and faster laparoscopic suturing, they should be used carefully in inframesocolic surgery and the suture end cut and buried to avoid inadvertent attachment to the small bowel or its mesentery. Barbed suture entanglement should be considered as an uncommon yet potentially serious differential cause for SBO presenting in the early period after laparoscopic surgery where a barbed suture has been used.

Key words: Barbed suture. Small bowel obstruction. Surgery. Complication.

BACKGROUND

Barbed sutures were first described as early as 1951 (1), and have evolved to become part of every day operative practice, particularly in laparoscopic surgery. The anchoring property of these materials obviates the need for a conventional surgical knot and provides tissue approximation and traction without requiring an assistant, thus improving

surgical efficiency. This is of particular benefit in minimally invasive procedures where constraints of space and manoeuvrability may present particular technical challenges. Currently, two types of barbed suture are most commonly employed in gastrointestinal surgery, namely V-loc® (2) and Quill® (3). However, despite their rapid uptake, little is known about the potential complications associated with these materials and concerns have begun to arise regarding their safety in some procedures.

Postoperative small bowel obstruction is common and has often been linked to the presence of foreign materials, particularly surgical mesh (4). Here we report two cases of small bowel obstruction (SBO) subsequently requiring surgical re-intervention that may be directly related to the use of barbed sutures. In both cases these complications arose from adherence of the suture's distal end to small bowel and mesentery. Review of the current literature highlights this is not an isolated phenomenon, identifying 15 reports of similar cases describing isolated SBO secondary to the intra-peritoneal use of barbed sutures. The aims of this study are therefore to draw attention to this relatively under recognised complication and to outline the mainstay of management in these patients.

CASE REPORT

Case report 1

A 58 year-old Caucasian lady presented to our hospital with a rectal prolapse requiring surgical correction. Routine laparoscopic posterior fixation rectopexy was performed with full circumferential rectal mobilization to the pelvic floor without intraoperative complications. The retracted mesorectum was then fixed to the presacral fascia using

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five midline Ethibond 3/0 suture (add details). The pelvic peritoneum was then closed after using V-loc sutures with the peritoneal closure finishing above the pelvic brim. The V-loc was cut short (< 0.5 cm) at this point. Despite making a good initial recovery with discharge on postoperative day two, on day ten the patient developed diffuse abdominal pain and distention requiring readmission, with evidence of small bowel dilatation on plain abdominal X-ray. Given the worsening of her clinical state and blood biochemistry, she was taken back to theatre for exploratory laparotomy. Intra-operatively, she had obstructed and volved the distal small bowel with subsequent strangulation and infarction. The cut end of the V-loc® suture above the pelvic brim was found to be tightly adherent to the small bowel and wrapped around the serosa causing obstruction and strangulation. 90 cm of strangulated small bowel was resected and a double-barrelled jejunostomy was fashioned. Post-operatively she made a slow recovery and was eventually discharged on after two months in hospital without further complications. Her jejunostomy was reversed four months after discharge via a peristomal approach.

Case report 2

76 year-old lady with maxillofacial cancer requiring feeding jejunostomy. Laparoscopic jejunostomy was performed with fixation of the small bowel to the anterior abdominal wall using a V-loc® barbed suture (Fig. 1). On post-operative day two, the patient developed diffuse abdominal pain and distention with associated vomiting and intolerance of her feed. She failed to improve with conservative management, and oral contrast-enhanced abdominal computerised tomography (CT) performed on day 5 demonstrated small bowel obstruction with suspected volvulus. She was returned to theatre for laparoscopic exploration. SBO was noted secondary to the cut end of V-loc® suture, which had become integrated into the small bowel serosa creating a volvulus with associated ischaemia (Fig. 1). Release of the adherent suture resulted in good re-perfusion and no resection was required. The serosal injury was oversewn. Post-operatively the patient had an uneventful recovery and was discharged on day two without further complication.

DISCUSSION

These two cases highlight a potentially severe complication occurring secondary to the use of barbed sutures in the intra-peritoneal cavity. Although uncommon, a literature search of PubMed, EMBASE, Google Scholar and the Cochrane Central Register of Controlled Trials identified 15 similar cases of small bowel obstruction, all of which occurred in patients undergoing surgery below the transverse colon (Table I). Surgical re-intervention was

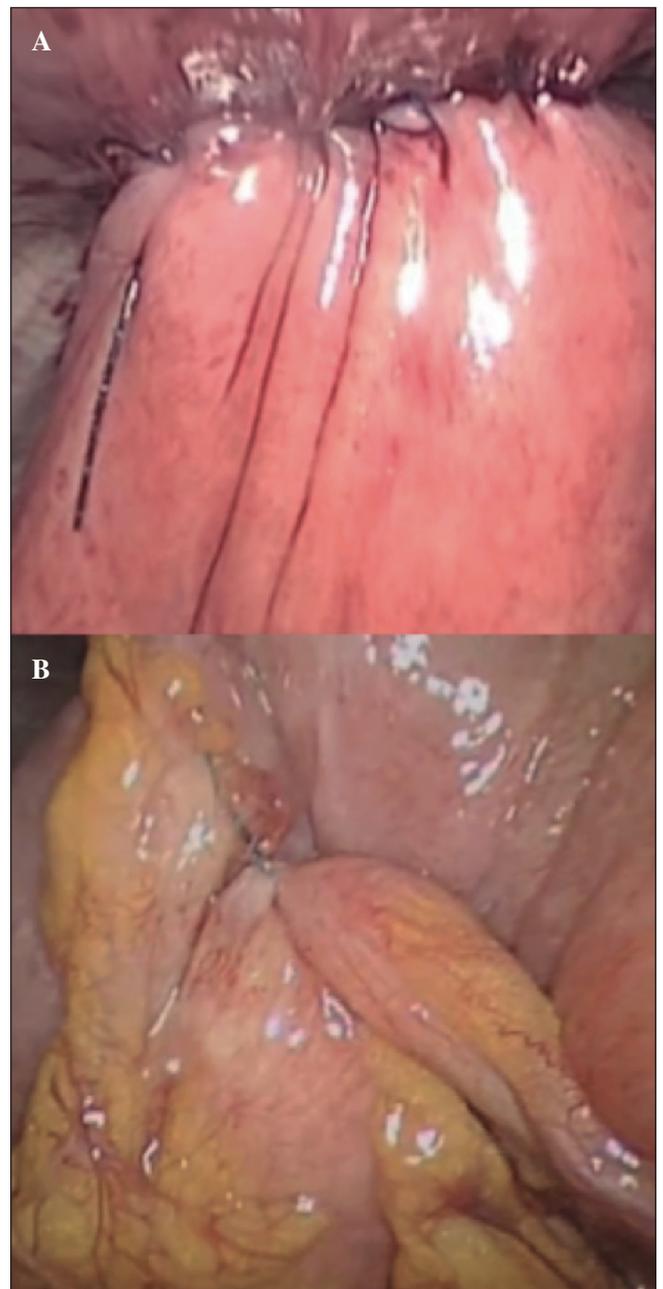


Fig. 1. Case report 1. A. Barbed suture end (< 5 mm) after laparoscopic feeding jejunostomy. B. Attached barbed suture end enlarged by traction causing SBO.

required in all cases although 60% of these were performed laparoscopically.

The mechanism of SBO documented in these cases is comparable to that described here. Where the cut end of the barbed suture is left long, it may become firmly attached to underlying small bowel or mesentery producing kinking and a transition point of obstruction. Torsion of the small bowel around this point of fixation may result in volvulus and where mesenteric blood flow is impeded, ischemia

Table I. Literature review. SBO secondary to barbed sutures reported cases

Author	Sex	Age	Day presented	Field	Surgery	Re-intervention	Laparoscopic reintervention	Required resection	Suture	Solution
Kindinger LM (8)	F	52	30	Pelvis	Miomectomy	Yes	Yes	No	Absorbable V-loc	Cut and liberate
Ovesen RJ (9)	M	62	5	Pelvis	Bilateral TAPP	Yes	Yes	No	Absorbable Vloc	Cut and liberate
Rombaut S (10)	F	30	21	Pelvis	Miomectomy	Yes	Yes	No	Absorbable Quill SRS	Cut and liberate
Vasudevan SP (5)	F	30	1	Pelvis	Rectopexy	Yes	Yes	No	V-loc	Cut and buried
Thubert T (11)	F	61	30	Pelvis	Colpopexy	Yes	No	No	V-loc	Cut and liberate
Buchs NC (12)	F	37	8	Pelvis	Inguinal hernia repair and pelvic floor repair	Yes	Yes	No	V-loc	Cut and liberate
Burchett MA (13)	F	48	40	Pelvis	Myomectomy	Yes	No	No	Absorbable V-loc	Enterorrhaphy
Donnellan NM (7)	F	49	30	Pelvis	Hysterectomy	Yes	Yes	No	Absorbable Quill	LapraTy
Salminen HJ (14)	F	18	7	Pelvis	Rectopexy	Yes	No	No	Absorbable V-loc	Cut and liberate
	F	35	30	Pelvis	Rectopexy	Yes	No	Yes	Absorbable V-loc	Cut and Trimmed
	F	72	120	Pelvis	Resection + rectopexy	Yes	No	Yes	Absorbable V-loc	Cut and Trimmed
Quibel S (15)	F	61	5	Pelvis	Hysterectomy, Anectomy	Yes	Yes	No	Absorbable V-loc	Cut and liberate
	F	50	5	Pelvis	Vaginofixation	Yes	Yes	No	Absorbable V-loc	Cut and liberate
St Marks & Northwick Park Hospitals	F	58	10	Pelvis	Rectopexy	Yes	No	Yes	V-loc	Cut and liberate
	F	63	5	Inframesocolic	Jejunostomy	Yes	Yes	No	Absorbable V-loc	Cut and enterorrhaphy

may occur. In one unusual case, the authors also noted entanglement between the cut ends of two V-loc sutures, producing a transition point and subsequent SBO (9). Although all cases resulted in surgical intervention, the mainstay of treatment is simple division of the embedded barbed suture and liberation of the entrapped bowel. Only in three cases small bowel resection was required. To prevent recurrence, the barbed suture may be additionally trimmed and buried either using absorbable sutures, or surgical clips (7).

The cases presented in this review highlight the potential for SBO to occur as a complication of the use of barbed sutures in laparoscopic surgery. Although these materials may improve surgical efficiency by facilitating tissue approximation particularly during laparoscopic procedures, the ability for the barbs to become non-specifically attached to surrounding tissue is of particular concern when in anatomical proximity to the small bowel and its mesentery. Where barbed sutures are used in the inframesocolic region, we therefore recommend precautions be taken so as to reduce the risk of SBO. In the case of V-loc sutures, we advocate that the ends are either buried, oversewn or cut flush with the tissue in which it is used (5). Notably, other authors have proposed alternative approaches to cover the suture end with either a cellulose sheath such as Surgicel (6), or a laparoscopic clip such as the LAPRA-TY® device (7).

CONCLUSION

As with any novel drug treatment, it is paramount that surgeons remain vigilant of and report the occurrence of previously unrecognised complications when new surgical devices or materials are introduced. In the case of SBO complicating the early period after laparoscopic inframesocolic surgery, it is important to consider barbed suture entanglement as a potential aetiology for this condition and maintain a high index of suspicion when reviewing post-operative imaging in these cases. We suggest that precautionary measures are taken to cover the ends of barbed sutures during inframesocolic surgery in order to optimise the benefits of this surgical technology.

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