



Long-term follow-up of the use of the Jones' intestinal tube in adhesive small bowel obstruction

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ABSTRACT

INTRODUCTION Intestinal intubation with a Jones' tube has been suggested to reduce the incidence of recurrent adhesive obstruction. This paper describes our experience of this technique.

PATIENTS AND METHODS A retrospective case-note review was performed on 68 patients admitted to a teaching hospital who were identified as having had the Jones' intestinal tube placed over an 11-year period from 1980 to 1991, with a follow-up to 2003. The indication for placement and outcome following placement of the tube were documented with particular reference to recurrence of adhesive small bowel obstruction.

RESULTS Data on 63 patients were available. Of these, 7 had the Jones' tube placed prophylactically after pouch surgery and were thus excluded from the main study. Of the remaining 56 patients, all had the Jones' tube placed for recurrent adhesive small bowel obstruction with a median follow-up of 92 months, representing 353 patient-years. In 51 patients, the Jones' tube was placed during emergency surgery, while five others had it placed electively. A total of 1.7 cases of adhesive small bowel obstruction per 100 years of patient follow-up were identified following use of the Jones' tube compared to 12.9 cases per 100 patient-years prior to the use of the Jones' tube.

CONCLUSIONS Intestinal intubation with a Jones' tube is a safe and effective method of preventing recurrent adhesive obstruction.

KEYWORDS

Adhesions – Intestinal obstruction

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Adhesive small bowel obstruction is a significant cause of morbidity following abdominal surgery. Almost 6% of patients undergoing open abdominal or pelvic surgery will be re-admitted within the subsequent 10 years directly because of these adhesions. Of these, over half will require operative management.^{1,2} Moreover, recurrent episodes of adhesive obstruction may occur in 29–42% of patients.^{3,4} In addition, the work-load and cost of treating adhesive small bowel obstruction is significant, thus impacting on the resources of a state-funded healthcare service.⁵

Two strategies have been employed in the management of postoperative adhesions. One strategy involved accepting that adhesions will form again, and fixing the bowel to ensure a favourable lie. Noble's suture plication of the small intestine was one such method, while transmesenteric plication, in which the mesentery, rather than the bowel, was plicated to ensure favourable lie, was another; both techniques are not popular due to their associated morbidity.^{6–9} The alternative strategy involved the use of drugs or chemicals to prevent adhesions, of which steroids, streptokinase

and dextran are noteworthy for their popularity (if not their efficacy).^{10–12} More recently, hyaluronate preparations have become popular although their success remains debatable.¹⁵

A variant of the plication methods involves intraluminal intestinal intubation. Again, accepting that adhesions will form, intestinal intubation relies on the intrinsic stiffness of the intraluminal tube to permit adhesion formation in a favourable position, and to avoid kinking of the bowel whilst adhesions form. The tube is later removed.

Various such intestinal tubes have been devised. Peter Jones devised his tube following his use of a Miller–Abbott tube,¹⁴ which had been brought to his attention in a paper by Baker.¹⁵ The tube is a 500-cm long Foley-type catheter made of PVC.¹⁶ This tube is introduced via a jejunostomy. It has a distal inflatable balloon and small holes at intervals along its distal length, which facilitate decompression of the bowel and which differentiate it from other long intestinal tubes. This study aims to assess the effectiveness of the Jones' tube in reducing the incidence of postoperative adhesive small bowel obstruction over an 11-year period.

Patients and Methods

Patients

The patients were initially identified from all the operating theatre records at Addenbrooke's Hospital for the 11-year period from 1980 to 1991. This yielded a total of 68 patients. The medical records of all the patients were then reviewed to provide additional information about episodes of bowel obstruction prior to and after use of the Jones' tube.

Follow-up was to 31 December 2003 or to the date of death. Information from the hospital case notes was supplemented by contacting the patients' general practitioners.

All relevant medical literature was also reviewed.

Placement of the Jones' tube

A tube that is virtually identical to that devised by Jones is currently used at our institution (Rüsch Medical, Germany); the standard placement technique is described here.¹⁶ After division of all adhesions and decompression of the obstructed bowel, a small incision is made in the abdominal wall along the left flank and the intestinal tube pulled through into the abdominal cavity. A purse string suture is placed on the antimesenteric border of the jejunum 10–15 cm distal to the duodenojejunal flexure. The bowel wall is incised and the tube fed into the jejunum, the suture being tightened around it. The balloon is then inflated and used to guide the tube down the whole length of the small intestine to the

ileocaecal valve, at which point the balloon is deflated to permit passage across the valve whence it is inflated again to prevent retraction into the distal ileum. Manipulation of balloon and tube also permits identification of any residual areas of narrowing. The length of the tube is then adjusted to ensure that there is no plicating of the bowel; the purse string is then tied and the jejunum secured to the abdominal wall. The balloon is then deflated.

The tube is attached to a closed bag and left on free drainage. Postoperative abdominal radiographs confirm correct placement and illustrate the lie of the bowel. When the patient is ready to go home, the tube is spigotted and removed on postoperative day 14 in clinic.

Results

Of the 68 patients identified, the medical records for 5 patients were no longer available as they had been dead for more than 11 years. Fifty-six patients had the Jones' tube placed for recurrent adhesional small bowel obstruction, 51 at emergency surgery and 5 electively. A further 7 patients were identified who had had the Jones' tube placed prophylactically after ileo-anal pouch formation; they were excluded from this study, but considered separately.

Of the 56 patients, 24 were female. The average age at the time of use of the Jones' tube was 47 years.

Table 1 Cases of small bowel obstruction subsequent to use of the Jones' tube

Patient	Age (years)	Previous episodes of SBO (& management)	Indication for Jones' tube	Procedure performed	Subsequent episodes of SBO (& management)	Months post use of Jones' tube	Follow-up (months)
1	30	3 (all conservative)	Acute ASBO (emergency)	Division of adhesions & appendicectomy	1 (surgical)	1	64 ^a
2	32	7 (5 conservative, 2 surgical)	Recurrent SBO (elective)	Division of adhesions	3 (all conservative)	11	62 ^a
3 ^b	40	2	Acute ASBO (emergency)	Division of adhesions & small bowel resection	1 (conservative)	16	163
4 ^b	50	1	Acute ASBO (emergency)	Division of adhesions	1 (surgical)	90	150

ASBO, adhesive small bowel obstruction; SBO, small bowel obstruction.

^aLost to follow-up (one due to emigration).

^bIntervening surgery between use of Jones' tube and adhesive small bowel obstruction.

Before use of the Jones' Tube

All 56 patients had undergone abdominal surgery at least once (defined as the peritoneum being surgically breached) excluding and preceding those operations related to small bowel obstruction. During this period, each patient had had a mean of 2.3 previous abdominal operations (range, 1–7). Fourteen patients suffered from inflammatory bowel disease, while 8 had received previous radiotherapy.

The period in between the breach of the peritoneum and the placement of the Jones' tube was examined. During this period of 653 patient years, there were 84 episodes of adhesive small bowel obstruction; two-thirds were managed conservatively while the rest required surgical intervention. This yielded 12.9 episodes of adhesive small bowel obstruction per 100 patient-years.

Fifty-one of the cases were emergency procedures to relieve acute small bowel obstruction, while the remaining 5 were performed on an elective basis. Of the emergency cases, 12 required bowel resection.

After the use of the Jones' tube

Four patients suffered a total of six episodes of adhesive small bowel obstruction following use of the Jones' tube (Table 1), occurring between 1 and 99 months following intubation. Three of these patients had one episode each; two were managed surgically and one conservatively. The fourth patient had three episodes, all of which were managed conservatively. Prior to use of the Jones' tube, this patient had experienced seven episodes of small bowel obstruction, two of which were managed surgically. In two of the patients, an intervening operation was performed between placement of the Jones' tube and the recurrent small bowel obstruction.

Median follow-up was 92 months (range, 12–204 months) by using a combination of hospital and general practitioner records, representing 353 patient-years. Thus, in the post Jones' tube period, there were 1.7 episodes of adhesive small bowel obstruction per 100 years of patient follow-up.

In 49 cases, the Jones' tube was introduced via a jejunostomy, with the rest being placed at the duodenojejunal junction. The tube was left in place for a median of 15 days (range, 4–22 days).

Recorded complications included one ileo-ileal intussusception requiring operative reduction.¹⁷ The other nine recorded complications were minor and consisted of superficial wound-site infections requiring oral antibiotics without prolonging the length of the patients' hospital stay.

Prophylactic use of the Jones' tube following pouch surgery

Seven patients had the Jones' tube placed prophylactically at the time of their ileo-anal pouch formation. In this sub-

group, the median follow-up was 96 months (range, 18–136 months). There was one incidence of small bowel obstruction which occurred 99 months after the Park's pouch formation due to stricturing at the ileostomy site.

Discussion

Unfortunately, even after successful surgical intervention for adhesive small bowel obstruction, a significant number of patients will, in time, go on to suffer from recurrent bouts of bowel obstruction secondary to adhesions. Demonstrating this point, in a long-term follow-up study of 500 patients who had all undergone a laparotomy for adhesive small bowel obstruction, the cumulative recurrence rate of adhesive small bowel obstruction was 18% at 10 years and 29% at 30 years.³ Each bout of bowel obstruction was, in turn, found to be associated with an increased the risk of future episodes of adhesive small bowel obstruction; thus, the rationale for a simple and quick intra-operative measure, such as the Jones' tube, which aims to reduce the incidence of this problem in the future.

The results from this retrospective, case-note review show that once the decision to operate is made, intubation of the small bowel with the Jones' intestinal tube is an effective method to reduce future episodes of adhesive small bowel obstruction, with acceptable rates of recurrence. A decrease in the number of episodes of adhesive small bowel obstruction from 12.9 per 100 patient-years to 1.7 per 100 patient-years was observed. The results from this study are in accordance with other reports where intraluminal stents have been used.^{11,18,19} What this study also shows is that the benefit appears to be sustained over a long period of follow-up. The decompressive effect of the Jones' tube is also thought, empirically, to be beneficial but this has not been quantified.

In all the four patients who suffered an episode of small bowel obstruction following use of the Jones' tube (Table 1), the underlying aetiology was thought to be adhesions. Furthermore, two of the patients had had further abdominal operations in the intervening period between the use of the Jones' tube and the development of small bowel obstruction. The failure of the Jones' tube to prevent these two episodes of small bowel obstruction could conceivably be due to adhesions arising from this intervening abdominal surgery.

The data presented accord with Jones' own published experience showing a low incidence of recurrence of adhesive obstruction in those patients who underwent previous surgery for adhesive obstruction.^{11,20}

The low incidence of any serious complications found in this study is also mirrored by similar findings in other studies of intubation.^{11,18,19} Apart from the ileo-ileal intussusception, none of the remaining nine minor complications

required any intervention, nor did they affect the clinical outcome.

Small bowel obstruction is the most common complication after panproctocolectomy with ileal pouch–anal anastomosis. Studies have shown a range of incidence of between 15%²¹ up to 43.5%.²² Some authors have carried out small studies demonstrating the benefits of prophylactic intestinal splinting after sub-total colectomy.²⁵ This was the rationale for the use of the Jones' tube as prophylaxis against adhesive obstruction in the seven patients undergoing of Park's pouch formation. While the numbers are too small to draw any significant conclusions, the use of the Jones' tube in a Park's pouch procedure appears promising.

The results from this retrospective review of use of the Jones' intestinal tube compare favourably with studies using hyaluronate carboxymethylcellulose preparations. Whilst these preparations have been shown to reduce the extent of adhesions,²⁴ the translation to clinical practice has been less convincing. In a large, randomised, multicentre trial comparing the use of a hyaluronate methylcellulose membrane against a control group, no difference in the overall bowel obstruction rate was seen.²⁵ The authors did, however, report a reduction in the number of patients requiring surgery to relieve adhesive small bowel obstruction in the treatment arm although 60 patients needed to be treated with the hyaluronate carboxymethylcellulose membrane to prevent one patient requiring re-operation for acute small-bowel obstruction. In addition, this and several other studies have shown that the use of hyaluronate carboxymethylcellulose agents is associated with a significantly higher incidence of intra-abdominal abscesses and anastomotic leaks.^{15,26}

In terms of health economics, the intestinal tubes are cheaper than hyaluronate carboxymethylcellulose compounds. This is even more apparent when the potential complications associated with the latter technique are considered.

The ideal duration of intestinal intubation remains unclear. Traditionally, patients remained in hospital for much longer periods than is common today after a laparotomy for small bowel obstruction. It has thus been difficult to assess whether the use of the Jones' tube played any role in prolonging the length of hospital stay during our study period as this extends back to 1980. In addition, there were only three cases where the duration of intubation was 6 days or less and thus a meaningful comparison between intestinal intubations of different durations against subsequent episodes of adhesive small bowel obstruction has not been possible. Currently, in our unit, the patient is discharged with the Jones' tube *in situ* but spigotted. The tube is then removed in clinic on day 14 at a time when new adhesions are believed to have formed. In this way, the effect of the use of the Jones' tube on the length of hospital stay following surgery is minimised.

Such a study suffers from the limitations of a retrospective case-note review, particularly when it comes to follow-up and determination of episodes of obstruction subsequent to the index admission. While a randomised, controlled trial might be desirable, the required follow-up would make such a study protracted and unwieldy. Naturally, it is not possible to blind either surgeon or patient in this technique. Furthermore, it is possible that sub-clinical episodes of small bowel obstruction may not have been picked up. However, all episodes of clinically diagnosed small bowel obstruction would have been identified. In addition, patients may have presented to other hospitals with small bowel obstruction with no further involvement from this hospital, although using the general practitioner notes would have reduced this effect.

Changes in surgical practice over the study period (1980–1991) may have influenced the incidence of small bowel obstruction. Surgical gloves containing talc powder, an agent known to produce adhesions, were common in the early 1980s, but have largely been dispensed with now.

It is unclear whether the Jones' tube offers any benefit over the other intraluminal stents in use in the management of acute small bowel obstruction. The Jones' tube differs in the presence of the distal holes, which afford good bowel decompression, but this issue could not be addressed in this study.

Conclusions

We recommend consideration of intestinal intubation in the treatment of patients with recurrent adhesive small bowel obstruction, or where initial surgery is likely to result in multiple adhesions. It is unlikely to be of use in the treatment of localised adhesions or situations where formation of generalised adhesions is uncommon.

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