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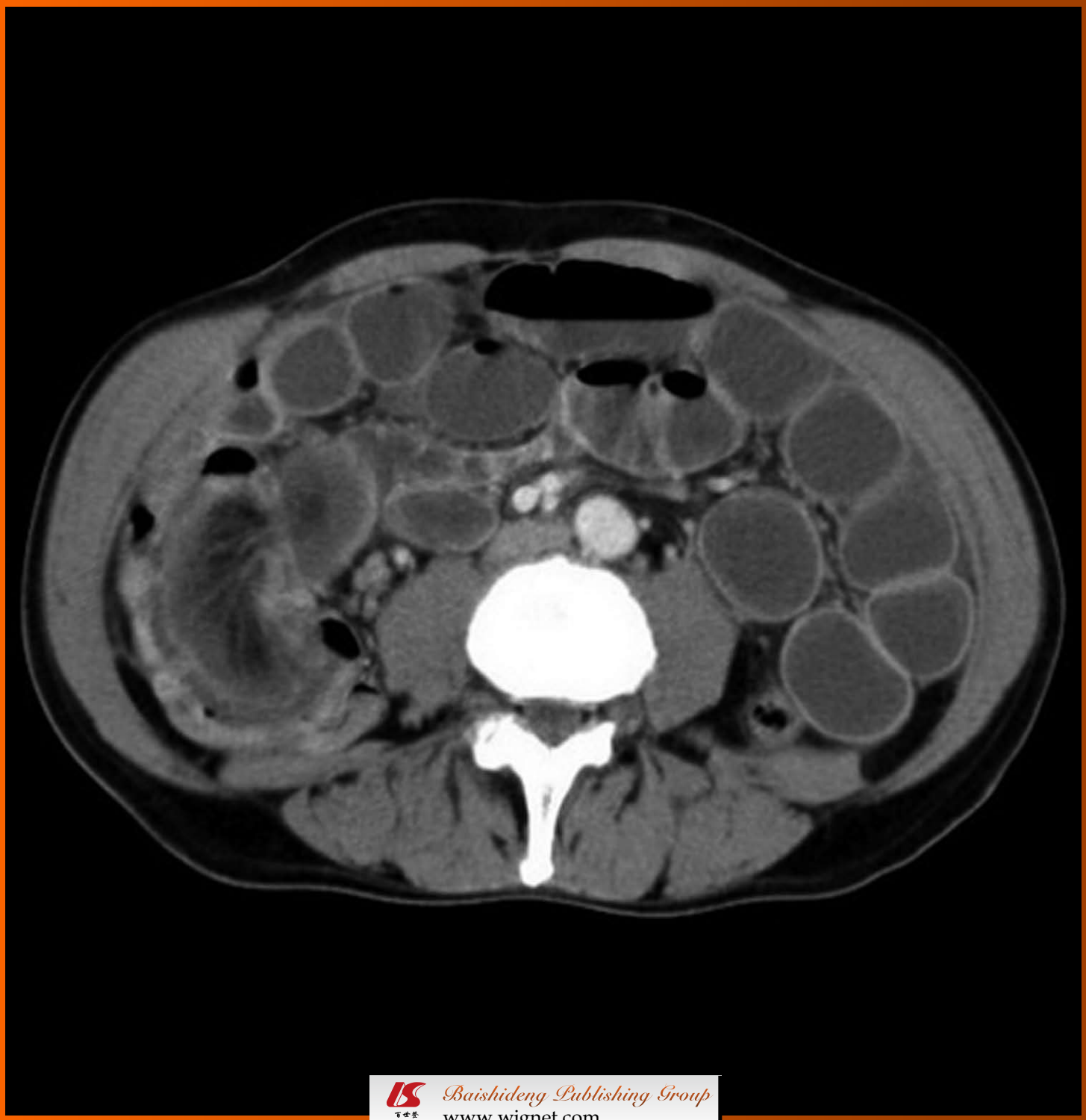

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EDITORIAL

Enhanced recovery after surgery programs hasten recovery after colorectal resections

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Abstract

Colorectal resection was traditionally associated with significant morbidity and prolonged stay in hospital. Laparoscopic colorectal resection was first described in 1991 as a minimally invasive form of colorectal surgery. It was later on assessed by multiple randomized controlled trials and meta-analysis and was found to be associated with a faster recovery, lower complication rates and a shorter stay in hospital compared with open resection. To assess the effect of enhanced recovery after surgery (ERAS) program on postoperative length of stay after elective colorectal resections, a literature review was conducted, supplemented by the results of 111 ERAS colorectal resections at regional NWS Hospital using a protocol based on the Fast Track approach described by Kehlet in 1999. ERAS has been shown to improve postoperative recovery, reduce length of stay and enhance early return to normal function when compared with traditional colorectal surgical protocols. The role of laparoscopic surgery in colorectal resections within a fast-track (ERAS) program is controversial. The current evidence suggests that within such a program, there is no difference between laparoscopic and open colorectal surgery in terms of postoperative recovery rates or length of hospital stay.

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Key words: Enhanced recovery after surgery; Colorectal surgery; Laparoscopy

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INTRODUCTION

Conventional open resection (COR) has been reported to be associated with overall morbidity rates of 23% to 30% and an average hospital stay of 10 d (7 to 12 d)[1-3]. Laparoscopic colorectal resection (CLR) was introduced in 1991 as a proposed less invasive alternative to COR[4,5]. In a published series of 20 sigmoid resections, the authors achieved their aim of a five-day hospital stay in 70% of the cases. Subsequent meta-analysis of randomized trials (RCTs) and of non-randomized comparative studies as well as a Cochrane review showed that CLR was associated with faster recovery, lower complication rates and a shorter stay in hospital compared with COR[2,3,6].

The concept of fast-track (enhanced recovery after surgery, ERAS) was introduced to colorectal surgical practice by Kehlet in 1999 to improve postoperative recovery rates and reduce the length of hospital stay[7]. In a series of 16 open sigmoid colectomies, the authors achieved their aim of a two-day hospital stay in about 60% of the cases.

MAIN ASPECTS OF FAST TRACK COLORECTAL SURGERY

The main aspects of ERAS programs include preoperative patient education, no routine bowel preparation, minimal peri-operative starvation, carbohydrate and protein loading, tailored anesthesia and postoperative analgesia, maintaining high oxygen concentration and normothermia, avoiding peri-operative fluid overload and early postoperative mobilization[8]. Their implementation in a surgical unit requires a team approach involving the surgical, anesthetic, nursing and other staff including physiotherapists, dieticians and stoma therapists. ERAS protocols address almost all aspects of patient management before, during and after admission.

Bowel preparation

One of the main elements of ERAS programs is avoiding routine mechanical bowel preparation (MBP). For over a century, preoperative MBP has been the standard care in colorectal surgery. Although different agents were used for bowel cleansing, the rationale behind MBP includes the evacuation of stool to allow visualization of the luminal surfaces and to reduce fecal flora thereby reducing infections and anastomotic leakage after colorectal surgery. This was challenged as early as 1972 by Hughes who claimed that patients undergoing MBP had similar outcomes to those who did not[9]. In a recently published systematic review of 13 RCTs (4777 resections), the authors found no evidence to suggest that MBP reduced the rate of anastomotic leakage[10]. In patients undergoing low anterior resections, anastomotic leakage occurred in 10% of the MBP group, compared with 6.6% of the no preparation group. For other colorectal resections, anastomotic leakage occurred in 2.9% of the MBP group, compared to 2.5% of the no preparation group. Although the differences were not statistically significant, the results strongly suggested that there was no advantage in routine MBP. In fact there may be a disadvantage in adopting an approach of routine MBP in colorectal resections as a microbiological study found that MBP did not influence the median bacteria colony count in colonic mucosa[11]. A more recent RCT involving 244 participants added to the evidence that colorectal surgery can be performed safely without MBP[12]. MBP is not harmless as it can cause severe dehydration and electrolyte disturbance that may complicate the peri-operative course. The avoidance of MBP is, therefore, one of the central themes of most enhanced recovery or fast-track protocols.

Pre-operative starvation

Another important aspect of traditional colorectal surgery changed by the ERAS approach is the length of pre- and post-operative starvation. The aim of the traditional fasting before surgery is to ensure an empty stomach at the time of anesthetic induction to reduce the risk of aspiration. To avoid confusion, patients are instructed to avoid eating and drinking from midnight the night before surgery and no distinction is made between solid and fluid intake. This strict rule has been questioned as it was shown that drinking clear fluids up to two hours prior to surgery did not increase gastric fluid volume or acidity[13]. A systematic review of 22 trials showed no significant evidence to suggest that shortened preoperative fluid fast increases the risk of regurgitation or aspiration although the majority of trials used gastric fluid volume and acidity as indirect measures of patient safety[14]. Surgery induces catabolic response characterized by insulin resistance, release of stress hormones (glucagon, cortisol, and catecholamines), and negative nitrogen balance[15]. Several animal studies have shown that fed animals respond well to hemorrhage or endotoxemia compared to fasted animals[14,15]. Transferring these findings transferred to the clinical setting, patients were tried on oral carbohydrate loading prior to surgery in an attempt to attenuate postoperative insulin resistance. In a randomized controlled study by Kaska and colleagues[16], 221 patients were randomized to fasting, intravenous glucose, or oral carbohydrate fluid. While there was no difference found in the length of hospital stay or complications rate, patients who had preoperative oral carbohydrate had physiological insulin levels postoperatively. This suggests that insulin resistance was the lowest in this group.

Post-operative starvation

Postoperative starvation until flatus is passed per rectum has been a routine surgical practice for fear of anastomotic leakage and postoperative ileus. It is known that malnutrition is prevalent among patients with gastrointestinal cancer[17]. It is also known that the physiological stress of surgery increases the metabolic rate. If postoperative patients are not provided with adequate nutritional support, excessive muscle proteolysis occurs. Protein catabolism with negative nitrogen balance and insulin resistance are the main consequences of prolonged starvation following surgery. In addition, malnutrition is associated with increased intestinal permeability and impaired gut barrier function. A systematic review by Lewis *et al*[18] evaluated early commencement of post-operative enteral nutrition in 13 RCTs including 1173 patients. Although statistical significance was not reached, there was a trend in favor of early enteral feeding in reducing anastomotic dehiscence, intra-abdominal abscess and wound infection at the expense of a somewhat increased incidence of vomiting.

Routine nasogastric decompression

Routine nasogastric decompression is usually used in conjunction with postoperative fasting. The purpose of prophylactic gastric decompression is to prevent nausea and vomiting, reduce distension, and achieve an earlier return to bowel function. In a Cochrane review of 37 studies investigating the use of prophylactic nasogastric decompression in 5711 patients[19], the authors reported that patients who did not have a nasogastric tube inserted had an earlier return of bowel function. There was no significant difference between the two groups in terms of anastomotic leak rates. Hospital length of stay was shorter when tubes were not routinely used.

Routine prophylactic drainage

Routine prophylactic drainage of colorectal anastomoses has been used to evacuate peri-anastomotic fluid collection. This was thought to reduce the risk of anastomotic dehiscence and allow for early detection and management of anastomotic leakage. A systematic review of 6 RCTs involving 1140 patients randomized to prophylactic drainage or no drainage found no significant differences in the rates of clinical or radiological anastomotic dehiscence, wound infection, or extra abdominal complications between the two groups[20]. Even in rectal or anal anastomoses in which the rate of anastomotic dehiscence is higher than other colorectal resections, routine use of pelvic drainage has not been shown to reduce anastomotic leakage rates[21,22].

Defunctioning ileostomy

Diverting fecal material away from anastomosis site has been thought to reduce the risk of anastomotic leakage in colorectal surgery. However, a Cochrane review of six RCTs showed the use of defunctioning stoma was only useful for resections of very low rectal tumors[23]. A defunctioning ileostomy was found to be associated with a reduced risk of reoperation due to an anastomotic leak for the very low anastomoses (within 5 cm of the anal verge). This was also in agreement with the findings of an earlier systematic review by Hüser and colleagues[24].

Fluid management

Perioperative fluid management continues to be a challenge as patients are often dehydrated due to pre-operative fasting or use of mechanical bowel preparation. Liberal use of intra-operative and post-operative intra-venous isotonic fluids increases cardiopulmonary morbidity, delays return of gastrointestinal function and prolongs hospital stay[25]. Restrictive intra and postoperative fluid resuscitation is found to be associated with fewer complications, earlier return of gastrointestinal function, and shorter hospital stay[26,27].

Postoperative analgesia

A multimodal analgesic approach is an essential component of any ERAS program. Epidural analgesia can be a valuable adjunct to general anesthesia for major abdominal surgeries and has been reported to reduce the risks of postoperative pulmonary complications, nausea and vomiting compared to opiates patient controlled analgesia[28]. The use of epidural local anesthetics in patients undergoing abdominal surgery has also been shown to reduce the incidence of gastrointestinal ileus compared to traditional analgesia or opiate epidural analgesia with comparable analgesic effects[29]. The authors suggested that nociceptive receptors and sympathetic nerves supplying the laparotomy wound inhibit the gastrointestinal tract and that blocking those receptors and nerves reduces the incidence of postoperative ileus. However, in our experience, a multimodal analgesic approach significantly improves postoperative recovery even without epidural analgesia.

Normothermia

Maintaining normothermia is also an important element of ERAS programs. Intra-operative hypothermia occurs in as many as 20% of surgical patients and is usually due to the cold environment of the operating theatre in addition to impaired thermoregulation associated with anaesthesia[30]. Peri-operative hypothermia has been shown to be associated with an increase risk of morbid cardiac events, bleeding and transfusion requirement as well as wound infection[31].

EVIDENCE FOR ERAS PROTOCOLS IN COLORECTAL RESECTIONS

ERAS protocols have been shown to be associated with faster recovery and a reduced length of stay in hospital compared with traditional colorectal resection[8]. A systemic review that included eleven studies (four RCTs, and seven controlled clinical trials) examined the evidence for ERAS protocols when compared with traditional care[32]. ERAS protocols were associated with 2.45 d shorter primary hospital stay, and 2.46 d shorter total hospital stay. Morbidity was lower in the ERAS group and there were no significant differences in readmission rates.

IMPLEMENTATION OF ERAS PROGRAMS

Despite the current evidence supporting the benefits of ERAS protocols, such protocols have not yet been widely adopted[33], probably due to the cost and resources required to train medical, nursing and allied health staff to commit and adhere to a strict program. Some aspects of ERAS protocols have been adopted into traditional care (such as earlier enteral feeding, early mobilization, and multimodal analgesia) without necessarily implementing a structured ERAS protocol.

A REGIONAL HOSPITAL'S EARLY EXPERIENCE WITH ERAS PROTOCOLS IN COLORECTAL SURGERY

A "Fast Track" colorectal cancer resection program was introduced as a structured protocol in July 2006 to Coffs Harbour Health Campus, a regional teaching hospital of the University of New South Wales.

This comprised: (1) Targeted pre-operative education by the colorectal clinical nurse consultant during an unhurried interview at the preadmission clinic with the provision of an information booklet focusing on "What to expect"; (2) An interview with the stoma nurse when indicated; (3) Nutritional assessment if required; (4) Minimal peri-operative starvation; (5) Preoperative carbohydrate and protein loading; (6) No routine MBP. Enema preparation if required; (7) Transverse or oblique incision if seen fit by the operating surgeon; (8) High oxygen concentrations; (9) Actively maintaining normothermia (space blankets, warmers and warm intravenous fluids); (10) Actively

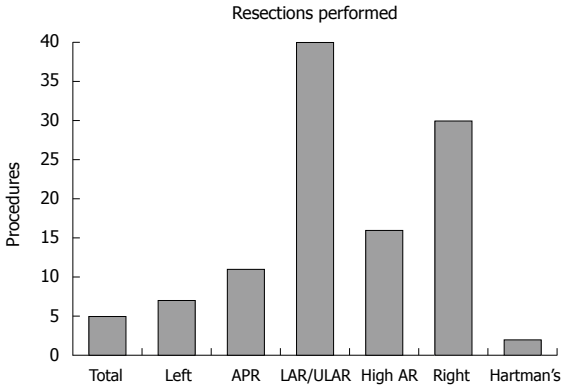

Figure 1 Summary of 111 enhanced recovery after surgery colorectal resections by one surgeon at Coffs Harbour July 2006 to July 2010. APR: Abdominoperineal resection; AR: Anterior resection; LAR: Low anterior resection; ULAR: Ultralow anterior resection.

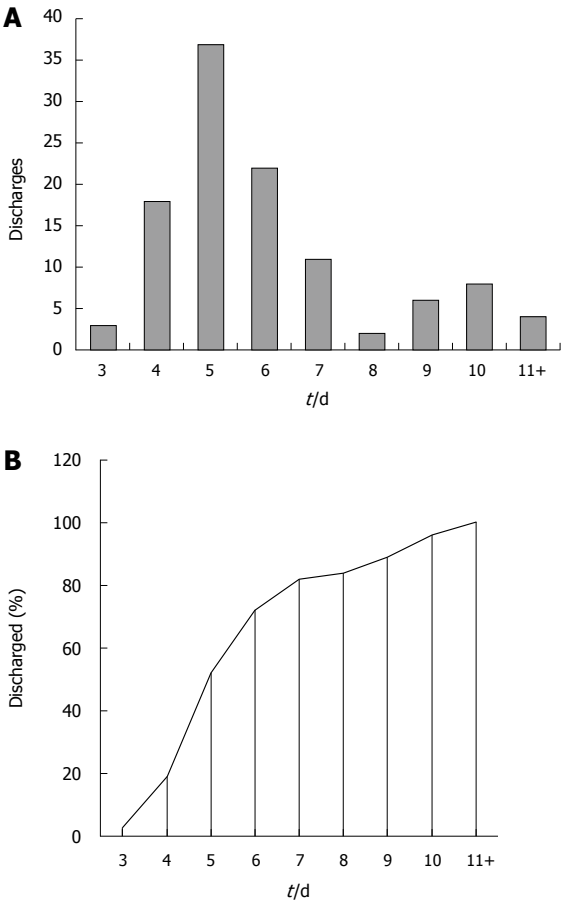

Figure 2 Number (A) and percentage (B) of patients discharged by postoperative day for 111 enhanced recovery after surgery colorectal resections at Coffs Harbour July 2006 to July 2010.

avoiding excessive intravenous hydration; (11) No routine use of nasogastric tubes; (12) No routine use of drains; (13) Multimodal Analgesia: (a) Epidural analgesia if seen fit by the anaesthetist; (b) Subcostal nerve block when possible; (c) Continuous wound infiltration with a local anaesthetic agent (wound soaker); (d) Regular oral non-narcotic analgesia; and (e) Minimal morphia only (by using patient activated applications); (14) Routine use of regular prokinetic agents; (15) Routine use of regular anti-emetic drugs; (16) Structured early postoperative mobilization program; (17) Early oral feeding (clear fluids on the evening of surgery, free fluid intake on day one and a soft diet on day two); and (18) Discharge on day 5 whenever possible.

Surgical outcomes

The outcomes of 111 colorectal resections by one surgeon using the ERAS protocol are presented (Figure 1). These comprised 40 low and ultralow anterior resections, 30 right hemicolectomies, 16 high anterior resections, 11 abdominoperineal resections, 7 left hemicolectomies, 5 total colectomies and 2 Hartman's procedures. The relatively large number of left sided resections was the result of local referral patterns at the time. The median age was 67 years (28 to 88 years).

Sixteen patients (14.4%) had other simultaneous procedures. Nine (8.1%) had temporary stomas and 11 (9.9%) permanent. The great majority of the anastomoses were stapled. There were no deaths. Anastomotic leakage, wound and other complications occurred in 4.1%, 10.8% and 13.5% respectively. There were 3 (2.7%) unplanned returns to the operating theatre; all for anastomotic leaks. The median length of stay was 5 d (range: 3 to 21 d). There were 6 (5.4%) unplanned readmissions within a month of the procedure. The median length of stay for the 82 colorectal resections preceding the introduction of the ERAS protocol was 11 d (Figure 2). A patient survey showed high levels of satisfaction with preoperative education, pain management, minimal post-operative fatigue and the fast return to pre-operative mobility level.

In 2009, a team from the Australian Safety and Efficacy Register of New Interventional Procedures - Surgical (ASERNIP-S) assessed the Coffs Harbour experience and that of others. They reported that fast-track surgery programs can result in beneficial outcomes for patients by reducing the length of hospital stay with no significant increase in readmission rates, that further work is required to assist in standardisation and implementation of protocols and that additional research is required to show how optimised approaches (Fast-track or ERAS programs) would differ from conventional methods[34].

ROLE OF LAPAROSCOPIC SURGERY WITHIN ERAS PROGRAMS

As pointed out above, the introduction of laparoscopic surgery has improved outcomes for patients undergoing colorectal resection with a conventional approach. However, the role of laparoscopic colorectal resection within a fast-track program is controversial. Most trials using the ERAS approach have so far failed to show an advantage in adopting the laparoscopic compared with the open technique. Basse and colleagues randomized 60 patients to either laparoscopic or open surgery within an ERAS rehabilitation program[35] and reported no difference between the two groups in terms of time of return to functional recovery, morbidity, mortality, length of stay

or number of readmissions. King and colleagues randomized 62 patients to receive laparoscopic or open surgery within an enhanced recovery program[36] and reported statistically significant differences between the two groups. The sample sizes were small in those two trials. A systematic review of the above two RCTs and three controlled clinical trials again failed to show a significant difference between laparoscopic and open surgery in the context of ERAS rehabilitation[37]. In a subsequent meta-analysis of 11 studies (4 RCTs and 7 controlled trials) including 1021 patients, the authors reported a clear benefit in adopting the ERAS approach with no evidence for an advantage in adopting the laparoscopic technique[32]. Laparoscopic colorectal resection has been shown to be associated with an increase in operating time (about 35%) and cost (at least 20%) as well as a steep learning curve compared with open resection[2,3,38].

CONCLUSION

The current evidence suggests that the implementation of an ERAS Program is associated with a faster recovery and a shorter length of hospital stay with no increase in complication rates at the expense of a possible small increase in readmission rates. Furthermore, with the implementation of such a program, the laparoscopic technique does not seem to show any advantage over the conventional open surgical approach. We currently aim to prospectively assess the results of laparoscopic versus open colorectal resections within an ERAS program. The LAFA trial[39] will examine laparoscopic and open colorectal surgery with or without fast-track rehabilitation and should shed more light on the issue.

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ORIGINAL ARTICLE

Clinicopathological features and the outcome of surgical management for adenocarcinoma of the appendix

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Abstract

AIM: To present a comprehensive analysis of incidence, clinicopathological features, appropriateness of surgical procedures, and survival for adenocarcinoma of the appendix.

METHODS: A retrospective case analysis was conducted for the 10-year period 1998-2008. All patients diagnosed with adenocarcinoma of the appendix were analyzed for their demographics details, clinical features, tumor incidence and characteristics, tumor stage, surgical procedures performed, and their survival.

RESULTS: Nine thousand three hundred and twenty-three patients underwent appendectomies during the study period, and of these, 10 (0.1%: 8 men and 2 women with a mean age of 53.1 years, age range 21-83 years) were found to have primary adenocarcinoma of the appendix. Appendicular neoplasia was not suspected pre-operatively in any of the patients. Six (60%) patients underwent secondary right hemicolectomy. Four (40%) cases had appendectomy alone, and two of them died, whereas all those who underwent right hemicolectomy are alive and disease free. Five (50%) were reported to have grade 1 disease, three (30%) grade 2, and two (20%) grade 3 with mean survival of 34, 48, and 22 mo, respectively. Six (60%) patients presented with advanced disease (Duke's C and D). At the end of follow up (mean period: 37.9 mo), eight patients are alive and disease free at the end of follow up. Overall mean survival was 36.3 mo (confidence interval; 16%-56%) with 41.3 and 16 mo for men and women, respectively. Mean survival for those with and without lymph node involvement was 33.6 and 40.2 mo, respectively. Right hemicolectomy gave better results than appendectomy alone, although the difference was not statistically significant due to the small number of cases.

CONCLUSION: Adenocarcinoma of the appendix is extremely rare neoplasm with varied presentations, and is usually advanced when diagnosed. Right hemicolectomy is the treatment of choice for such tumors.

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Key words: Adenocarcinoma of the appendix; Appendectomy; Appendicitis; Right hemicolectomy

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INTRODUCTION

Primary adenocarcinoma of the appendix accounts for 0.4%-1% of all gastrointestinal malignancies[1] and 4%-6% of primary appendiceal neoplasms[2]. It is found in only 0.9%-1.4% of appendectomy specimens with an age-adjusted incidence of 0.12 cases per million people per year[3]. The diagnosis of appendiceal adenocarcinoma is rarely established pre-operatively and less than half of

cases are diagnosed intra-operatively during acute or elective abdominal operations[4,5]. Most tumors are identified only after histological examination of the removed specimens[6]. The rarity of adenocarcinoma of the appendix has made it difficult to clearly understand the natural history of the disease and to amass extensive data on which to base therapeutic and diagnostic decisions. A review of the current literature regarding the optimal treatment for noncarcinoid appendiceal cancer reveals variability in the recommendations for optimal surgical treatment.

Our study presents a review of the clinical presentations, various therapeutic modalities, and the outcome of surgical treatment for adenocarcinoma of the appendix.

MATERIALS AND METHODS

A retrospective review was performed of the medical files of all consecutive patients who underwent appendectomies, in a single university based center, over the period 1998-2008. The records of patients with histologically established adenocarcinoma of the appendix were analyzed for their demographics, clinical features, operative procedures, histopathological reports, and the final outcome. Pathological specimens were categorized by the type of neoplasm, grade, and the lymph nodes status. Tumor stage was evaluated using the SEER staging system (localized, regional, and distant), which corresponds to Stage Ⅰ-Ⅱ, Ⅲ, and Ⅳ, respectively, of the American Joint Committee on Cancer 5th TNM staging system[1]. The data was statistically analyzed by a SPSS 13.0 software package (SPSS Inc., Chicago, IL). Survival plots were generated using Kaplan-Meier analysis and prognostic variables were determined using log-rank, Breslow, and Tarone-ware tests. There were too few patients for a multivariate analysis.

RESULTS

Nine thousand three hundred and twenty-three patients were incorporated in this series and of these, 10 cases (0.1%: 8 male and 2 female patients with a mean age of 53.1 years, age range 21-83 years) were reported to have primary adenocarcinoma of the appendix (Table 1). No patient was pre-operatively diagnosed to have appendicular carcinoma. Appendicitis was reported to be the most frequent presenting complaint. Based on the histological diagnosis of appendiceal cancer, six (60%) patients underwent a secondary right hemicolectomy (3 laparoscopic and 7 open) following appendectomy and all are alive and disease-free. Four (40%) cases underwent appendectomy alone and two of them died after two and seventeen months, respectively. Eight (80%) patients had colonic type and 2 (20%) cystic type adenocarcinoma of the appendix. Three (30%) patients were found to have stage Ⅰ-Ⅱ disease, 3 (30%) stage Ⅲ, and 4 (40%) stage Ⅳ. Five (50%) patients had grade 1lesions, three (30%) grade 2 and two (20%) grade 3. Patients with positive lymph nodes received systemic chemotherapy which consisted of 5-fluorouracil either alone or in combination with other agents.

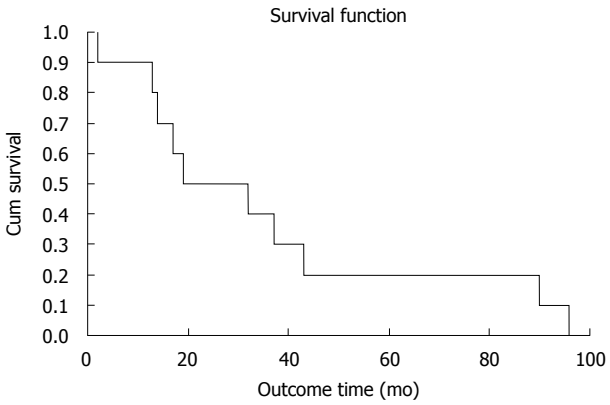

Figure 1 Survival analysis of final outcome.

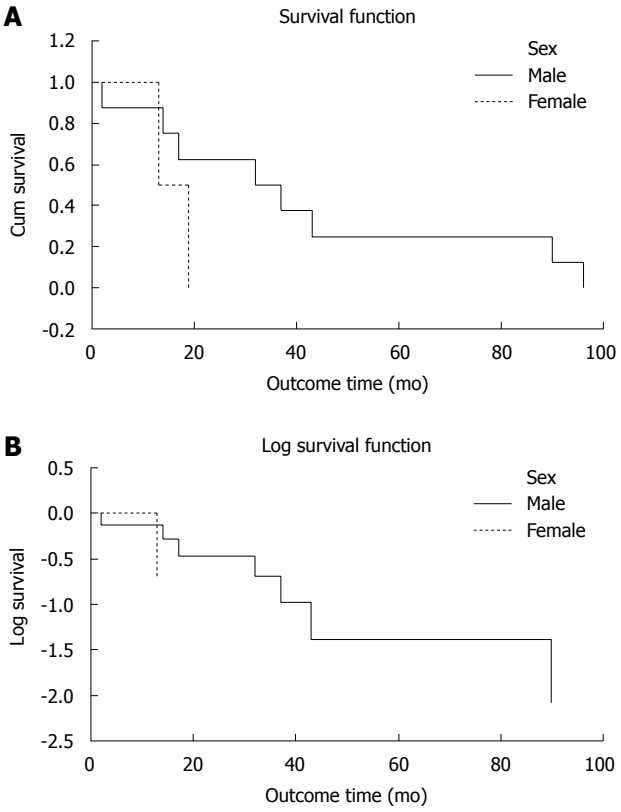

Figure 2 Survival analysis of outcome (A) and log survival function curve (B) for male and female patients.

After a mean follow up time of 37.9 mo, eight patients are alive and disease free. Mean survival in this series was 36.3 mo (Figure 1) with a 95% confidence interval (95% CI) of 16.27%-56.33%. Mean survival for male and female patients was 41.3 and 16 mo, respectively (95% CI 17.44%-31.65% and 10.12%-21.88%) (Figure 2A and B). The results of Log Rank, Breslow, and Tarone-ware statistical tests for the equality of survival distributions for sex showed 1.86 (significance 0.1729), 1.33 (significance 0.2482), and 1.58 (significance 0.2081), respectively. The median survival of patients with grade 1, 2, and 3 tumors was 34, 48 and 22 mo, respectively (Figure 3A and B). Mean survival for patients without lymph node involvement was 40.25 mo (95% CI: 77.42) whereas mean sur-

Table 1 Summary of patients with adenocarcinoma of appendix (n = 10)

No.	Age (yr)	Sex	Preoperative diagnosis	Operation	Histopathology				Final outcome
					Type	Duke's	Grade	LN	
1	76	M	Appendicitis	Appendectomy	Colonic	A	1	-	Died, 17 mo
2	83	M	RIF mas	App→RH	Colonic	D	3	+	Alive, 3 yr, 1 mo
3	68	M	PR bleeding	App→RH	Colonic	C	1	-	Alive, 4 yr
4	48	M	Appendicitis	Appendectomy	Cystic	A	1	-	Alive, 14 mo
5	21	F	Appendicitis	Appendectomy	Colonic	A	1	-	Alive, 19 mo
6	49	M	Appendicitis	Appendectomy	Cystic	A	2	+	Died, 2 mo
7	65	M	RIF mas	App→RH	Colonic	D	2	+	Alive, 8 yr
8	69	M	Appendicitis	App→RH	Colonic	C	2	+	Alive, 7 yr, 6 mo
9	37	F	Appendicitis	App→RH	Colonic	C	1	+	Alive, 13 mo
10	80	M	Cecal cancer	App→RH	Colonic	C	3	+	Alive, 3 yr, 7 mo

RIF: Right iliac fossa; PR: Per rectal; App: Appendectomy; RH: Right hemicolectomy; LN: Lymph node.

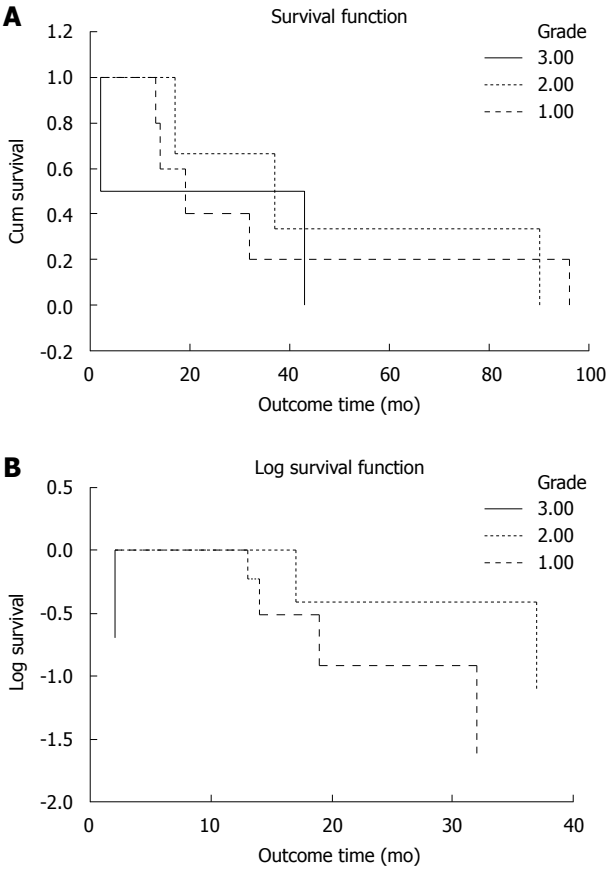

Figure 3 Survival analysis of outcome (A) and log survival function (B) for different grades of adenocarcinoma of appendix.

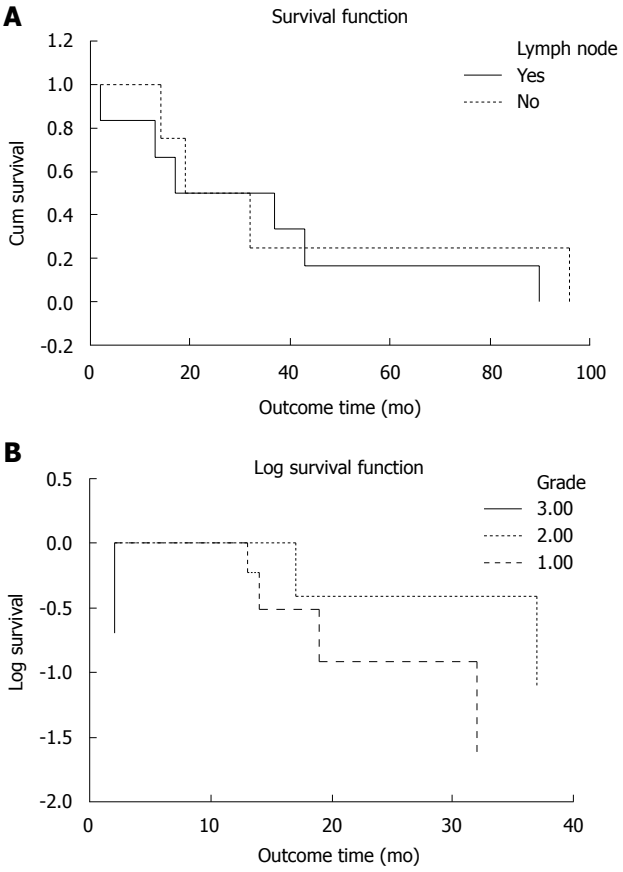

Figure 4 Survival analysis of outcome (A) and log rank function (B) for lymph node involvement by adenocarcinoma of appendix.

vival for those patients with involved lymph nodes was 33.67 mo (95% CI: 58.92) as shown in Figure 4A and B.

DISCUSSION

Primary adenocarcinoma of the appendix is exceedingly rare with a reported incidence of 0.08%-0.2% of appendectomies[7]. Carcinoid tumors are the most common primary lesions arising from the appendix, comprising 32%-85% of all appendiceal tumors[8,9], with adenocarcinomas accounting for a further 4%-6% of tumors[10]. A slight male predominance is documented in the literature[11,12] which is in contrast to our results which showed significantly greater number of affected male patients. The published mean age of presentation is in the 5th or 6th decade with a reported range of 17-89 years[13], similar to our results.

Most symptomatic appendiceal tumors present as acute appendicitis or a palpable mass[14-16]. Rarer presentations include masquerading as primary bladder cancer[17], pelvic mass causing urinary frequency[18], fever and hydronephrosis[19], Crohn's disease[20], vaginal bleeding[21], cecal intus-

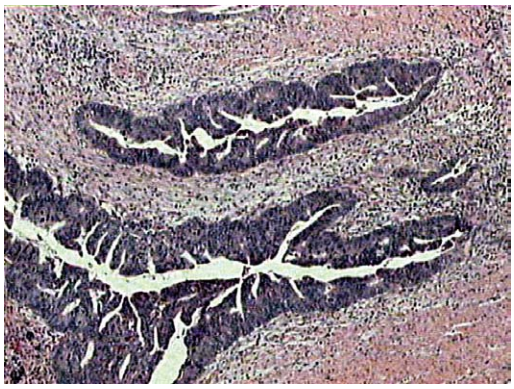

Figure 5 A well-differentiated adenocarcinoma of the appendix in which the glands demonstrate intense hyperchromatism, and the stroma is surrounded by lymphocytes.

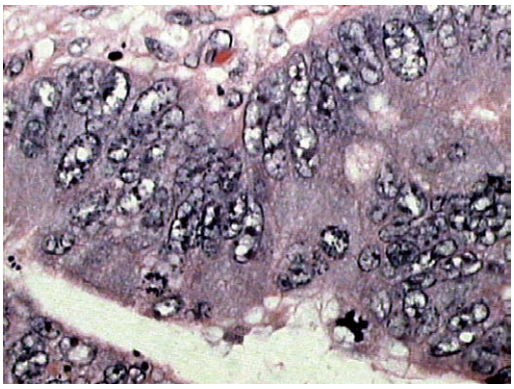

Figure 6 The high power microscopy of adenocarcinoma cells showing hyperchromatisn, pleomorphism abnormal mitotic figures, prominent nucleoli and regular thickening of nuclear membrane.

susception[22], and anemia[23]. Our study revealed 6 (60%) patients presented with the clinical impression of acute appendicitis. There are no symptoms specific to appendiceal cancer. Most symptoms result from associated disease such as, acute appendicitis, chronic recurrent appendicitis or peritonitis from perforation of the appendix[24]. In none of our patients was an objective diagnosis of appendiceal cancer made pre operatively, in agreement with the published reports[12,25]. This is attributed mainly to the lack of definite diagnostic, clinical, sonographic or radiological features characteristic of this disease[26]. Investigations such as ultrasound, computed tomography-scan, and magnetic resonance imaging of the abdomen might be advantageous in making the diagnosis before surgery[27], but are seldom performed for logistic reasons[28]. Sakamoto *et al*[29] achieved the first ever pre-operative diagnosis of intramucosal adenocarcinoma of the appendix by colonoscopy. The tumor was also removed by the endoscope. However, resection is not appropriate for appendiceal lesions as an intussuscepted appendix can sometimes mimic a polyp[30], and because accurate evaluation of the base of the lesion is difficult. The appendix must always be subjected to histological examination as, otherwise, an appendiceal malignancy can be easily missed[31].

Adenocarcinoma of the appendix arises in pre-existing adenomas, with either a cystic or colonic growth pattern. Cystic-type appendiceal carcinoma is a mucin-producing tumor which tends tending to rupture and spread through the peritoneal cavity, resulting in pseudomyxoma peritonei. Less common is the colonic-type of tumor that develops from a tubular or a tubulovillous adenoma[5]. Our study revealed a greater number[8] of colonic-type appendiceal adenocarcinomas (Figures 5 and 6). A narrow appendiceal diameter predisposes to neoplastic luminal occlusion early in the course of a colonic-type tumor[32], leading to appendicitis and a rupture rate as high as 56%[12]. Adenocarcinoma of the appendix is the most frequently perforating carcinoma of the gastrointestinal tract[33]. Anatomically there appears to be several reasons for this: (1) an extremely thin subserosal and peritoneal coat; (2) a delicate vascular submucosa supplied by a terminal artery; and (3) extremely thin longitudinal and circular muscular layers of the appendix. Interestingly, perforation had no significant effect on reported outcomes[15]. With the colonic-type of appendiceal adenocarcinoma, the perforated neoplastic cells have a low survival potential and less tendency to peritoneal implantation. The same authors also documented that patients with perforation faired better than those without perforation (74% *vs* 69% at 5 years and 48% *vs* 40% at 10 years) although there was no statistical difference ($P = 0.14$ and $P = 0.08$, respectively). In our study, no patient presented with perforated appendix. Adenocarcinoma of the appendix, like carcinoma of the colon, spreads via local invasion, lymphatic vessels, and the bloodstream. The most common metastatic location is the peritoneal cavity, followed by lymph nodes, liver, ovaries, abdominal wall, and lungs[34].

Controversy still prevails concerning the preferred surgical treatment for adenocarcinoma of the appendix. Cortina *et al*[15] concluded in their series that patients who underwent right hemicolectomy had a better prognosis for survival than patients who had appendectomy alone, although the difference was not statistically significant. Several other reports agree with this management strategy[35,36]. On the other hand, Murphy *et al*[1] suggested that appendectomy is appropriate for tumors found incidentally at operation, if the tumor was confined to the appendix, smaller than 2 cm, without evidence of mesoappendiceal involvement, and not extending to base of the appendix. For an optimal outcome, any neoplasm greater than 2 cm and involving the base of the appendix or mesoappendix should be considered for immediate right hemicolectomy. However, diminished tactile feedback during laparoscopic appendectomy potentially makes the detection of a cecal or appendiceal base lesion extremely difficult. Hata *et al*[37] suggested that early adenocarcinoma of the appendix rarely has lymph node metastases, and that well-differentiated adenocarcinoma invading the submucosa, or adenocarcinoma of any differentiation confined to the mucosa, may potentially be treated by simple appendectomy. On the other hand, poorly differentiated cancer is quite likely to be associated with lymph node metastases and secondary right hemicolectomy with

lymph node dissection should be considered in patients with: (1) lymphatic and/or venous invasion; (2) poorly differentiated adenocarcinoma; and (3) massive invasion of the submucosa. In patients with Duke's C stage, adjuvant chemotherapy, with 5-fluorouracil and levamisole may improve the survival, although another report found no benefit in survival from the use of systemic chemotherapy[38]. Hesketh[39] reported that the 5-year survival rate was 20% with appendectomy alone, while it was 63% with right hemicolectomy. Hopkins *et al*[40] reported rates of 20 and 45%, respectively. Our series substantiates these reports that right hemicolectomy is the treatment of choice for appendiceal adenocarcinoma, although the results are not statistically significant owing to a small number of cases. In our study, 6 (60%) underwent secondary right hemicolectomy, and all are still alive and disease free. On the other hand, two of the four patients had appendectomy alone died due to extensive metastases. Adenocarcinoma of the appendix often metastasizes to the ovaries and bilateral oophorectomy is recommended, especially if post menopausal, for staging and to eliminate metastatic spread to the ovaries[12]. A 5-year survival rate of 55% for appendiceal adenocarcinoma with a deteriorating prognosis correlating with an increasing Duke's staging has been established[12,41]. Colorectal cancers have 3%-5% risk of synchronous and 2%-3% metachronous tumors of the appendix, and a recent report[42] has observed similar incidences of synchronous and metachronous tumors of the appendix.

To conclude, adenocarcinoma of the appendix presents with diverse clinical features and the surgeon should maintain a high level of suspicion especially when managing patients with questionable appendicitis in older age groups. For optimal outcome, right hemicolectomy should be performed in all patients.

COMMENTS

Background

Primary adenocarcinoma of the appendix accounts for 0.4%-1% of all gastrointestinal malignancies and 4%-6% of primary appendiceal neoplasms. It is found in only 0.9%-1.4% of appendectomy specimens with an age-adjusted incidence of 0.12 cases per million people per year. The diagnosis of appendiceal adenocarcinoma is rarely established pre-operatively and less than half of cases are diagnosed intra-operatively during acute or elective abdominal operations. Most tumors are identified only after histological examination of the removed specimens.

Research frontiers

The rarity of adenocarcinoma of the appendix has made it difficult to clearly understand the natural history of the disease and to amass extensive data on which to base therapeutic and diagnostic decisions.

Innovations and breakthroughs

This study presents a review of the clinical presentations, various therapeutic modalities, and the outcome of surgical treatment for adenocarcinoma of the appendix.

Applications

The authors concluded that the adenocarcinoma of the appendix is extremely rare neoplasm with varied presentations, and is usually advanced when diagnosed. Right hemicolectomy is the treatment of choice for such tumors.

Peer review

The authors give us some interesting and important data with morphologic correlation and the readability of the article is high.

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CASE REPORT

Ileal lipoma - a rare cause of ileocolic intussusception in adults: Case report and literature review

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Abstract

The occurrence of intussusception in adults is rare, accounting for less than 5% of all cases of intussusceptions and almost 1%-5% of bowel obstruction. The condition is found in less than 1 in 1300 abdominal operations and 1 in 100 patients operated for intestinal obstruction. The child to adult ratio is more than 20:1. We report a rare case of ileocolic intussusception in an adult secondary to an ileal lipoma.

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Key words: Intussusception; Lipoma; Adult; Ileocolic; Bowel obstruction

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INTRODUCTION

The occurrence of intussusception in adults is rare, accounting for less than 5% of all cases of intussusceptions and almost 1%-5% of bowel obstruction. The condition is found in less than 1 in 1300 abdominal operations and 1 in 100 patients operated for intestinal obstruction. The child to adult ratio is more than 20:1. We report a rare case of ileocolic intussusception in an adult secondary to an ileal lipoma.

CASE REPORT

A 65-year old man presented with a three day history of colicky abdominal pain and bilious vomiting. He had a weight loss of 10 kg in the preceding year. His past medical history included duodenal ulcer surgery 27 years ago and an appendicectomy during childhood.

On examination, he was apyrexial and hemodynamically stable. His abdomen was distended with localized tenderness in the right iliac fossa and no palpable abdominal masses; bowel sounds were hyperaudible. Initial laboratory blood tests were normal.

Plain abdominal X-ray showed dilated small bowel loops (Figure 1) with no evidence of free intraperitoneal air on chest X-ray. Computed tomography (CT) scan of the abdomen and pelvis showed findings suggestive of ileocolic intussusception (Figure 2A and B). The leading point was a 12 mm fatty density structure within the bowel lumen and separate from the mesentery (Figure 3). The decision was made to undertake an urgent exploratory laparotomy.

At laparotomy, ileocolic intussusception (Figure 4) was found for which a right hemicolectomy with ileo-tranvserse colon anastomosis was performed. The patient had an uneventful postoperative recovery. The histopathology report confirmed a 12-mm submucosal lipoma in the terminal ileum as a cause for a 15-cm ileocolic intussusception. There was no evidence of dysplasia or malignancy.

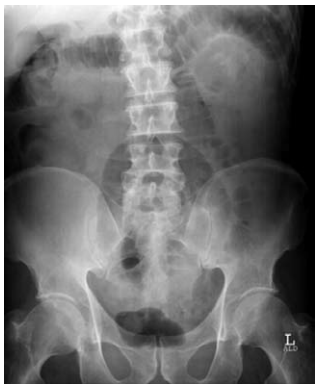

Figure 1 A plain abdominal film showing gaseous distension of the small bowel with a lack of gas within the colon apart from the rectum. The appearances are suggestive of small bowel obstruction.

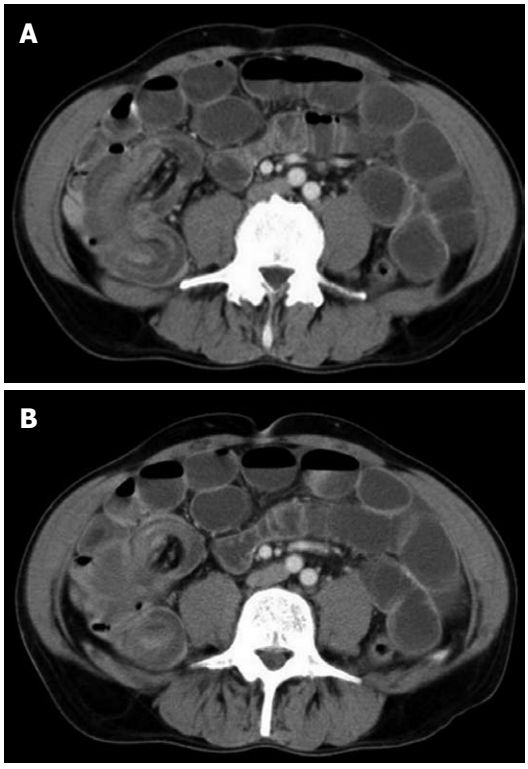

Figure 2 Computed tomography scan of the abdomen without oral contrast. Notice the characteristics of the mesentery - a fatty density with blood vessels. A: A longitudinal cut view of the intussusception shows the "sausage" shape; B: "Target" or "Crescent-in donut" is seen on the cross-sectional views of the intussusception.

DISCUSSION

Intussusceptions are classified according to location. The most common classification system divides intussusception into four categories: enteric, ileocolic, ileocaecal and colonic[1-4]. Enteric and colonic intussusceptions are those that are confined to the small intestine and large intestine respectively. Ileocolic intussusceptions are defined as those with prolapse of the ileum through the ileocaecal valve into the colon and these constitute 15% of all intussusceptions. The ileocaecal valve and the appendix preserve their normal anatomical position and the organic lesion is usually in the ileum[4,5]. These organic lesions are mostly benign although malignant lesions can also be seen[3].

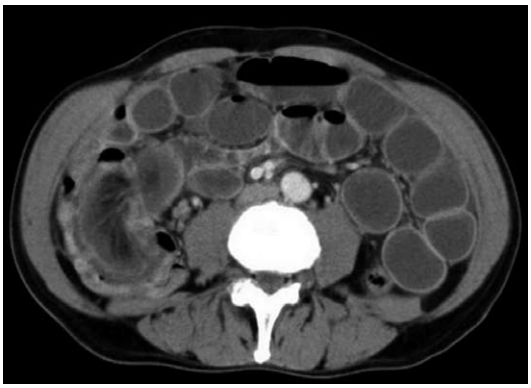

Figure 3 The leading point is a 12 mm Lipoma: a homogenous fat density mass in the lumen in cross section.

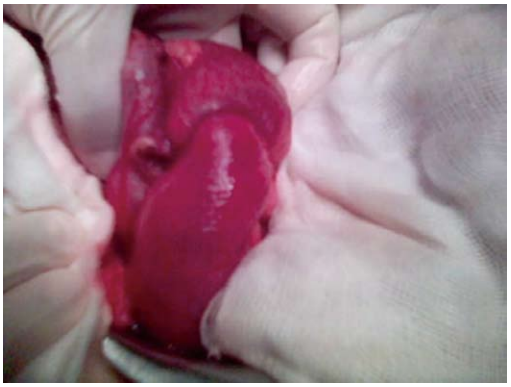

Figure 4 Intra-operative appearance of the intussusception.

Lipomas are benign tumors of mesenchymal origin. They are the second most common benign tumors in the small intestine and account for 10% of all benign gastrointestinal tumors and 5% of all gastrointestinal tumors. They are predominantly submucosal and protrude into the lumen. Occasionally, they arise in the serosa. Gastrointestinal lipomas are most commonly located in the colon (65% to 75%, especially on the right side), small bowel (20% to 25%) and occasionally in the foregut (< 5%)[6]. Lipomas are largely asymptomatic. The majority of presenting features are either intestinal obstruction or hemorrhage[7].

The clinical presentation is very non-specific which makes this a difficult condition to diagnose. Abdominal pain, nausea, diarrhea and bleeding per rectum are the common symptoms. Rarely, this can present with acute intestinal obstruction. The classical triad of abdominal pain, sausage shaped palpable mass and passage of red current jelly stools seen in children is rarely seen in adults[1,8].

Lipomas can be diagnosed through conventional endoscopy, capsule endoscopy, barium studies and, most importantly, CT scan. Typical endoscopic features are a smooth, yellowish surface with pedunculated or sessile base. Other endoscopic characteristics are the "cushion sign" and "naked fat sign"[6]. CT usually reveals a smooth, well-demarcated sausage-shaped mass. It may

also reveal associated intussusception if present[9]. Capsule endoscopy and digital balloon endoscopy are newer means for diagnosing lipomas and are particularly helpful in cases involving small bowel lipomas[6]. Associated intussusception can be confirmed on contrast enema ("crescent sign"), CT and magnetic resonance imaging (MRI). Multislice CT facilitates the assessment of vascular supply to the affected bowel loop in cases of intussusception where impending ischemia is suspected[10].

In most cases of adult colonic intussusception, primary resection without reduction should be performed, particularly in those over 60 years of age due to a higher risk of malignancy. In cases of small bowel intussusception, reduction before resection should be carried out only if the pre-operative diagnosis of benign etiology is confirmed, the bowel is viable or it entails resecting massive lengths of small bowel with the risk of short gut syndrome as a sequela[11-13].

In conclusion, adult bowel intussusception is a rare but challenging condition for the surgeon. Preoperative diagnosis is usually missed or delayed because of nonspecific and often subacute symptoms. A high index of suspicion and appropriate investigations (USS, barium enema and CT scan) can result in prompt diagnosis. Gastrointestinal lipoma is a rare pathology and its most common complications are invagination and obstruction.

Due to the fact that adult intussusception is often frequently associated with malignant organic lesions, surgical intervention is necessary. Treatment usually requires formal resection of the involved bowel segment.

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CASE REPORT

Peritoneovenous shunt for intractable ascites due to hepatic lymphorrhea after hepatectomy

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Abstract

A peritoneovenous shunt has become one of the most efficient procedures for intractable ascites due to liver cirrhosis. A case of intractable ascites due to hepatic lymphorrhea after hepatectomy for hepatocellular carcinoma that was successfully treated by the placement of a peritoneovenous shunt is presented. A 72-year-old Japanese man underwent partial resection of the liver for hepatocellular carcinoma associated with hepatitis C viral infection. After hepatectomy, a considerable amount of ascites ranging from 800-4600 mL per day persisted despite conservative therapy, including numerous infusions of albumin and plasma protein fraction and administration of diuretics. Since the patient's general condition deteriorated, based on the diagnosis of intractable hepatic lymphorrhea, a subcutaneous peritoneovenous shunt was inserted. The patient's postoperative course was uneventful and the ascites decreased rapidly, with serum total protein and albumin levels and hepatic function improving accordingly. For intractable ascites due to hepatic lymphorrhea after hepatectomy, we recommend the placement of a peritoneovenous shunt as a procedure that can provide immediate effectiveness without increased surgical risk.

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Key words: Peritoneovenous shunt; Surgical procedure; Intractable ascites; Hepatic lymphorrhea; Hepatocellular carcinoma

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INTRODUCTION

In abdominal surgery, especially after extended lymphadenectomy for gastroenterological cancer, lymphatic vessel injury causes lymphorrhea[1-4]. The postoperative lymphorrhea usually disappears spontaneously within a short time. However, intractable ascites sometimes develops in patients with liver cirrhosis[5,6], heart failure or renal failure. When a copious lymphatic discharge occurs, it is often difficult to improve the patient's general condition, serum protein and electrolyte stores.

In 1974, LeVeen was the first to describe the placement of a peritoneovenous shunt (PVS) for intractable ascites due to liver cirrhosis[7]. Later, with the development of the Denver shunt, placement of PVS became an effective procedure for such cases.

The case of a patient with intractable ascites due to hepatic lymphorrhea from the hepatoduodenal ligament after radical hepatectomy for hepatocellular carcinoma (HCC), successfully treated by PVS placement with excellent recovery from copious ascites, is presented.

CASE REPORT

A 73-year old Japanese man was referred to our hospital for diagnostic work-up of two space-occupying lesions in the liver detected during follow-up abdominal ultrasonography for hepatitis C viral infection. The patient was asymptomatic and free from ascites. Physical examination revealed cool moist skin, pulse rate of 68 beats per min and blood pressure of 131/83 mmHg. He had a previous history of treatment including interferon therapy for hepatitis C infection aged 59 years. Laboratory findings were as follows: serological examination was positive for hepatitis C virus antibody and negative for hepatitis B surface antigen; hematocrit 37.1%, platelets 193 × 10^3/μL (normal range, 162-329 × 10^3/μL); serum aspartate aminotransferase 90 IU/L (normal range, 10-35 IU/L), alanine aminotransferase 154 IU/L (normal range, 5-35 IU/L), bilirubin 0.4 mg/dL (normal range, 0.1-1.0 mg/dL), total protein 8.8 g/dL (normal range, 6.3-8.0 g/dL), albumin 4.2 g/dL (normal range, 3.5-5.0 g/dL) and prothrombin time 82% (normal range, 80%-120%). The indocyanine green retention rate at 15 min after injection was 18.7% (normal range, < 10%). Serum alpha-fetoprotein was 29.5 ng/mL (normal range, < 15 ng/mL) and des-gamma carboxyprothrombin (PIVKA-Ⅱ) was 29 mAU/mL (normal range, < 40 mAU/mL). Computed tomography during angiography showed two tumors, 3 and 1.3 cm in diameter, in liver segments S4 and S8, respectively (Figure 1). Abdominal ultrasound and magnetic resonance imaging (MRI) also showed similar findings. No abnormal findings were seen in other abdominal organs; there was no ascites.

With a preoperative diagnosis of HCC in S4 and S8 of the liver, partial resection of the liver was conducted in October 2007. At laparotomy, there was no ascites or peritoneal metastasis. The liver showed early stage cirrhotic change and tumors were located in S4 and S8. After cholecystectomy, a vessel loop was placed around the hepatoduodenal ligament for the Pringle maneuver. At that time, well-developed lymphatic ducts were noticed mainly in and around the hepatoduodenal ligament which were meticulously ligated and severed. During this procedure, a lymphatic oozing point was detected and ligated as well. Partial resection of the liver was performed *via* an anterior approach using a Cavitron ultrasonic surgical aspirator (SonoSurg system; Olympus Inc., Tokyo, Japan) and bipolar electrocautery with a saline irrigation system without the Pringle maneuver. The operation lasted 5 h and 55 min and blood loss was 850 mL.

The resected liver specimens weighed 60 and 15 g and the tumors measured 2.8 cm × 2.2 cm and 1.4 cm × 1.2 cm, in S8 and S4, respectively. The histological diagnoses of both tumors were moderately differentiated HCC (Edmondson grade Ⅱ) without invasion into portal or hepatic venous systems. No positive surgical margin or metastases to regional lymph nodes were confirmed microscopically.

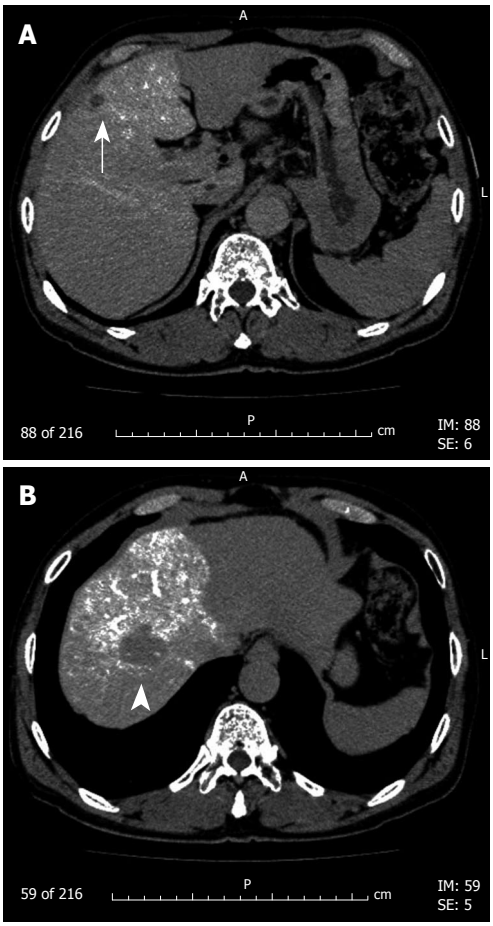

Figure 1 Preoperative abdominal computed tomography during angiography. This computed tomography reveals low density areas indicating two hepatocellular carcinoma nodules (arrow, arrowhead) of about 1.3 and 3 cm in diameter, in liver segments 8 (A) and 4 (B).

Starting from 3 d postoperatively, a considerable amount of ascites fluid ranging from 800-4600 mL per day drained from the abdominal drainage tube which was intractable despite albumin or plasma protein infusion and diuretic administration. The ascites was clear-colored and was diagnosed biochemically as non-chylous lymphorrhea. Cytological examination revealed no malignant cells and bacterial culture was also negative. At this time, hepatic lymphorrhea derived from surgical injury to the lymphatic vessels in and/or around the hepatoduodenal ligament was suspected since complete resolution of the lymphatic leak was not achieved intraoperatively. Thus, intractable ascites occurred although we had vigorously attempted to deal with leakage from the lymphatics. Based on the diagnosis of hepatic lymphorrhea without contamination of malignant cells, we decided to place a subcutaneous PVS (Denver shunt®, Denver PAK Single-Valved Ascites Shunt; Denver Biomedical, Golden, Co., USA) to avoid further deterioration of the patient's nutritional status and progression of his immunocompromised condition.

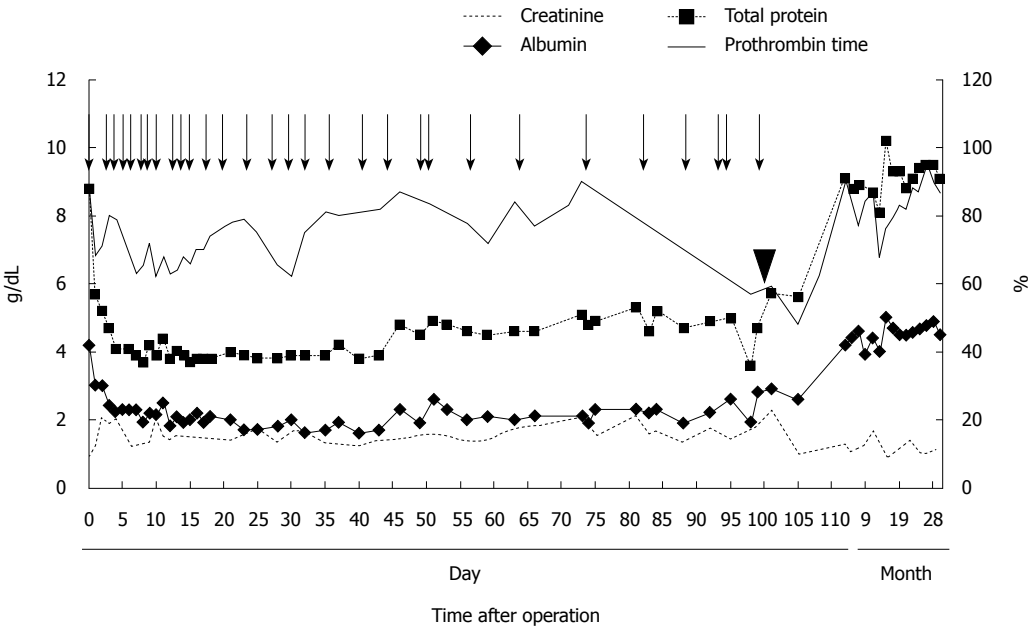

Figure 2 Serial changes in serum prothrombin time (%), creatinine (g/dL), total protein (g/dL), and albumin (g/dL). The arrow indicates intravenous infusion of 5 g of albumin. The arrowhead indicates the time of the placement of the peritoneovenous shunt (PVS). Note that the PVS placement resulted in dramatic improvement of these parameters which was not attainable by medical treatment.

On the 98th postoperative day, a PVS was placed *via* the right subclavian vein under general anesthesia. The pump chamber site was created over the lower right rib cage to facilitate manual compression of the pump. The patient's intra- and postoperative course was uneventful, his abdominal circumference decreased rapidly and his prothrombin time, serum creatinine, total protein and albumin levels improved accordingly (Figure 2). The patient was discharged on postoperative day 111 (12 d after PVS placement). Presently, he is doing well with no sign of HCC recurrence and on the last follow-up he had no ascites without using the PVS for which removal is now planned.

DISCUSSION

Intra abdominal lymph pathways are mainly classified into hepatic and intestinal lymph pathways. These two pathways both drain into the cisterna chylia round the first and second lumbar vertebra and subsequently into the circulatory system through the thoracic duct. The hepatic lymphatic system has two major pathways (i.e. ascending and descending) of the lymphatics. *Via* the ascending pathway, lymph from the surface of the upper part of the liver flows along the diaphragm into the cisterna chyli while lymph from the liver bed and in the liver flows along the hepatic veins. The descending pathway runs through the hepatoduodenal ligament including the portal vein, hepatic artery and bile duct. Intestinal lymph drains 50%-75% of intra abdominal lymph and contains many lipid droplets of long-chain fatty acids; thus its color is milky. On the other hand, hepatic lymph drains 25%-50% of intra abdominal lymph and the lymph is characterized as containing protein at a density as high as plasma without lipid droplets and so is clear-colored[1,2].

Although there are many reports describing the diagnosis, causes and treatment of chylous ascites from intestinal lymphorrhea[8], little is known regarding hepatic lymphorrhea following abdominal surgery[1-4]. Hepatic lymphorrhea is caused by injury of the lymphatic vessels during surgery, most of which occurs particularly within the hepatoduodenal ligament. In most instances, postoperative lymphatic leakage generally subsides spontaneously without special treatment. However, it becomes intractable in cases of substantial injury to major lymphatic vessels around the cisterna chylia and thoracic duct.

In the present case, the diameter and flow volume of the lymphatic vessels in and around the hepatoduodenal ligament were significantly notable due to underlying chronic hepatitis. Moreover, lymphatic vessel injury could not have been repaired completely during the surgery, subsequently causing persistent hepatic lymphorrhea.

In intractable ascites due to postoperative lymphorrhea, abundant lymphatic outflow from the drain usually leads to the loss of circulating proteins, depletion of electrolyte stores and a reduction in circulating blood volume, all of which results in further deterioration of the patient's clinical condition. The conventional and conservative treatments for lymphorrhea consist of supplementary infusion of albumin or plasma protein fraction, diuretic therapy, total parenteral nutrition (TPN) and intravenous re-infusion of condensed ascitic fluid. Surgical interventions include ligation of the leaking point of the lymphatic vessels and placement of a PVS. A literature search in the English and Japanese medical literature

Table 1 Characteristics, therapies and clinical outcome of the patients with hepatic lymphorrhea after abdominal surgery

Case No.	Author	Age/sex	Operation	Treatment	Time to complete resolution (d)
1	Miyagawa, 1983	65/M	TG	Surgical ligation	13
2	Nakashima, 1985	58/M	DG	Surgical ligation + antibiotics + sclerotherapy	30
3	Nakano, 1987	49/M	TG	Surgical ligation	14
4	Kawata, 1989	52/M	DG	Surgical ligation + fibrin glue + sclerotherapy	37
5	Umehara, 1989	59/M	TG	Surgical ligation	28
6	Kaneko, 1991	44/M	DG	Surgical ligation + PVS	30
7	Imai, 1992	34/M	TG	Reoperation + antibiotics + sclerotherapy	7
8	Shimizu, 1992	62/M	DG	Surgical ligation	30
9	Ota, 1993[1]	70/M	DG	Surgical ligation + fibrin glue	50
10	Mitsuno, 1993	42/M	DG	PVS	ND
11	Kawahira, 1994[2]	58/M	DG	Surgical ligation + fibrin glue + OK-432 sclerotherapy	10
12	Matsumoto, 1995	44/M	DG	Re-re-surgical ligation + fibrin glue	14
13	Tanaka, 1998	49/M	DG	Surgical ligation + fibrin glue + OK-432 sclerotherapy	12
14	Tanaka, 2004[4]	66/M	TG	Surgical ligation + fibrin glue + OK-432 sclerotherapy	67
15	Present report	73/M	Partial resection of the liver	PVS	12

TG: Total gastrectomy; DG: Distal gastrectomy; PVS: Peritoneovenous shunt; ND: Not described.

yielded a further 14 reports of hepatic lymphorrhea following abdominal surgery. Clinical and operative details of these cases and the present case are given in Table 1.

Ligation of the lymphatic leaking point using a pigment was reported to be extremely useful[1,4]. The placement of a PVS is mainly used for intractable ascites due to decompensated liver cirrhosis and it is a simple and cost-effective procedure. The present case was resistant to diuretic therapy, TPN and numerous plasma protein products; the patient's activities of daily life (ADL) gradually worsening due to disturbance of mobility, impairment of oral intake and compromised respiratory function. Therefore, we finally placed a PVS before the patient's condition became irreversible. PVS was preferred, mainly because of the expected technical difficulty in detecting the leakage point based on our impression during the previous surgery, in addition to predictable intra-abdominal adhesions.

In 1974, LeVeen was the first to describe the placement of a PVS for intractable ascites due to liver cirrhosis[7]. Later, with the subsequent development of the Denver shunt, surgical placement of a PVS for malignant ascites, chylous ascites and lymphorrhea was reported[9]. To the best of our knowledge, there have been no reports of PVS use for hepatic lymphorrhea following hepatectomy. The main characteristic of PVS is its immediate effectiveness by rapid reduction of the ascites whereby patients become able to take enough orally and to resume ADL. Moreover, ascites from hepatic lymphorrhea would eventually cease while using a PVS as time passes, as seen in the present case. Major complications that have been described include disseminated intravascular coagulation, occlusion and shunt infection[5,8,9]. Moreover, it cannot be denied that PVS for hepatic lymphorrhea after hepatectomy for malignant tumor may prompt hematogenous dissemination of malignant cells; this needs further observation although HCC is generally not closely associated with lymphatic metastasis. In summary, if the pathological diagnosis for HCC can rule out residual malignant cells such as vascular and lymphatic invasion by the tumor and positive surgical margin of hepatectomy, PVS is a good option as an alternative to ligation on re-laparotomy which can provide a modality that is quite safe, simple and effective.

In conclusion, for intractable ascites due to hepatic lymphorrhea after hepatectomy, we recommend the placement of a PVS as an option that can provide immediate effectiveness without the increased surgical risk associated with re-operation.

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Meetings

Events Calendar 2011

January 15-19, 2011
EAES Advanced Laparoscopic GI Surgery Course, Cairo, Egypt

January 20-22, 2011
Gastrointestinal Cancers Symposium (ASCO GI), San Francisco, CA, United States

January 26-30, 2011
5th UK Alpine Liver and Pancreatic Surgery Meeting, Carlo Magno Zeledria Hotel, Madonna di Campiglio, Italy

February 01-03, 2011
6th Annual Academic Surgical Congress, Huntington Beach, CA, United States

February 21-26, 2011
Minimally Invasive Surgery Symposium 2011, The Grand America Hotel, Salt Lake City, Utah, United States

March 03-06, 2011
The Society of Surgical Oncology 63rd Annual Meeting, San Antonio, TX, United States

March 10-13, 2011
The American Hepato-Pancreato-Biliary Association Annual Meeting, Miami Beach, FL, United States

March 14-17, 2011
British Society for Gastroenterology Annual Meeting, International Convention Centre, Birmingham, United Kingdom

March 25-27, 2011
NZAGS Conference 2011 GI Surgery, New Plymouth, New Zealand

March 30-April 02, 2011
The Society of American Gastrointestinal and Endoscopic Surgeons 2011 Annual Meeting, San Antonio Convention Center, San Antonio, TX, United States

April 02-06, 2011
The American Association for Cancer Research 102nd Annual Meeting, Orlando, FL, United States

April 10-12, 2011
The American Association of Endocrine Surgeons 32nd Annual Meeting, Houston, TX, United States

April 14-16, 2011
The American Surgical Association 131st Annual Meeting, Boca Raton, FL, United States

May 07-10, 2011
Digestive Disease Week, Chicago, IL, United States

May 07-10, 2011
45th Annual Meeting of the Pancreas Club, Chicago, IL, United States

June 15-18, 2011
19th International Congress of the European Association for Endoscopic Surgery, in collaboration with and incorporating the 15th National Congress of the Italian Society of Endoscopic Surgery, Torino, Italy

September 10-14, 2011
International Congress of Endoscopy, Los Angeles, CA, United States

September 22-24, 2011
5th joint EAES and ESGE, European Workshop on NOTES, Frankfurt, Germany

September 23-25, 2011
The New England Surgical Society 92nd Annual Meeting, Breton Woods, NH, United States

September 23-27, 2011
ECCO-European Society for Medical Oncology Congress, Stockholm, Sweden

October 23-27, 2011
The American College of Surgeons 97th Annual Clinical Congress, San Francisco, CA, United States

November 02-05, 2011
American Pancreatic Association 42nd Annual Meeting, Chicago, IL, United States

November 13-16, 2011
The Western Surgical Association 119th Scientific Session, Tucson, AZ, United States

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Instructions to authors

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World Journal of Gastrointestinal Surgery (*World J Gastrointest Surg*, *WJGS*, online ISSN 1948-9366, DOI: 10.4240), is a monthly, open-access (OA), peer-reviewed journal supported by an editorial board of 336 experts in gastrointestinal surgery from 35 countries.

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Maximization of personal benefits

The role of academic journals is to exhibit the scientific levels of a country, a university, a center, a department, and even a scientist, and build an important bridge for communication between scientists and the public. As we all know, the significance of the publication of scientific articles lies not only in disseminating and communicating innovative scientific achievements and academic views, as well as promoting the application of scientific achievements, but also in formally recognizing the "priority" and "copyright" of innovative achievements published, as well as evaluating research performance and academic levels. So, to realize these desired attributes of *WJGS* and create a well-recognized journal, the following four types of personal benefits should be maximized. The maximization of personal benefits refers to the pursuit of the maximum personal benefits in a well-considered optimal manner without violation of the laws, ethical rules and the benefits of others. (1) Maximization of the benefits of editorial board members: The primary task of editorial board members is to give a peer review of an unpublished scientific article *via* online office system to evaluate its innovativeness, scientific and practical values and determine whether it should be published or not. During peer review, editorial board members can also obtain cutting-edge information in that field at first hand. As leaders in their field, they have priority to be invited to write articles and publish commentary articles. We will put peer reviewers' names and affiliations along with the article they reviewed in the journal to acknowledge their contribution; (2) Maximization of the benefits of authors: Since *WJGS* is an open-access journal, readers around the world can immediately download and read, free of charge, high-quality, peer-reviewed articles from *WJGS* official website, thereby realizing the goals and significance of the communication between authors and peers as well as public reading; (3) Maximization of the benefits of readers: Readers can read or use, free of charge, high-quality peer-reviewed articles without any limits, and cite the arguments, viewpoints, concepts, theories, methods, results, conclusion or facts and data of pertinent literature so as to validate the innovativeness, scientific and practical values of their own research achievements, thus ensuring that their articles have novel arguments or viewpoints, solid evidence and correct conclusion; and (4) Maximization of the benefits of employees: It is an iron law that a first-class journal is unable to exist without first-class editors, and only first-class editors can create a first-class academic journal. We insist on strengthening our team cultivation and construction so that every employee, in an open, fair and transparent environment, could contribute their wisdom to edit and publish high-quality articles, thereby realizing the maximization of the personal benefits of editorial board members, authors and readers, and yielding the greatest social and economic benefits.

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6 21st century heart solution may have a sting in the tail. *BMJ* 2002; **325**: 184 [PMID: 12142303 DOI:10.1136/bmj.325.7357.184]

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12 **Breedlove GK**, Schorfheide AM. Adolescent pregnancy. 2nd ed. Wieczorek RR, editor. White Plains (NY): March of Dimes Education Services, 2001: 20-34

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15 Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis serial online, 1995-01-03, cited 1996-06-05; 1(1): 24 screens. Available from: URL: http://www.cdc.gov/ncidod/eid/index.htm

Patent (list all authors)

16 **Pagedas AC**, inventor; Ancel Surgical R&D Inc., assignee. Flexible endoscopic grasping and cutting device and positioning tool assembly. United States patent US 20020103498. 2002 Aug 1

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