

Ileal-conduit following cystectomy, single-institution revision of indications and outcome

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ABSTRACT

الهدف: أجريت هذه الدراسة لمراجعة و تقييم عملية قناة اللفائف كإحدى طرق تحويل مجرى البول بعد استئصال المثانة المصابة بالسرطان, من حيث سبب اختيار هذه الطريقة لكل مريض, نسبة الوفيات, و المضاعفات المبكرة و المتأخرة الناجمة عنها.

الطريقة: هذه دراسة استرجاعية إلى (٢٠٠) مريضا أجريت لهم جراحة استئصال المثانة المصابة بالسرطان وتم تحويل مجرى البول بواسطة قناة اللفائف في مركز المنصورة لأمراض الكلى وجراحة المسالك البولية في الفترة من آب ١٩٩٤ إلى كانون الأول ٢٠٠٠ م. تمت مراجعة المعلومات المرضية قبل إجراء الجراحة, أثناء الجراحة, و المتابعة السريرية بعد إجراء الجراحة.

النتائج: تم اختيار قناة اللفائف لتحويل مجرى البول بسبب وجود أحد الأمراض المزمنة التالية عند المرضى كأمراض القلب والأوعية الدموية, تشمع الكبد, اعتلال وظيفه الكلى, داء السكري المتفقم, و السمنة المرضية المفرطة أو لاكتشاف امتداد السرطان إلى الأنسجة المجاورة كالإحليل, أو نسيج غدة البروستاتة عند الرجال, وعنق المثانة عند النساء أو لأن بعض المرضى كانت لديهم التصاقات شديدة للأعضاء مع غشاء البريتون أو غشاء مسار يقي قصير. كانت نسبة المضاعفات المبكرة ١١,٥% بينما سجلت نسبة ٢٣,٧% للمضاعفات المتأخرة.

خاتمة: لا تزال عملية قناة اللفائف لتحويل مجرى البول هي الخيار الأفضل للكثير من مرضى سرطان المثانة عند وجود واحد أو أكثر من الأمراض المزمنة أو العوامل الجراحية عند المريض التي تجعل من الصعوبة وأحيانا من الخطورة إجراء عمليات أخرى أكثر تعقيدا لتحويل مجرى البول بعد استئصال المثانة.

Objective: To revise indications, case fatality ratio, and postoperative early and late complications of ileal conduit as a method of urinary diversion.

Methods: This is a retrospective study in which 200 patients underwent an ileal conduit from August 1994 to December 2000 in Mansoura Urology and Nephrology Center, Mansoura, Egypt. Preoperative criteria of patient selection, peroperative findings, and postoperative follow-up data were reviewed.

Results: In 200 patients aged 29-75 years, with a mean age of 55.84 ± 8.91 years, the ileal conduit was chosen as a method of urinary diversion, due to one of the following patient or surgical factors; 50 (25%) cardiopulmonary co-morbidities, 27 (13.5%) liver cirrhosis, 20 (10%) impaired renal function, 18 (9%) poorly controlled diabetes mellitus, and 3 (1.5%) morbid obesity. Frozen section pathological examination showed carcinoma invasion of the urethra in 26 (13%), and prostate stroma in 16 (8%) male patients. Severe adhesions and difficult cystectomy were encountered in 25 (12.5%) patients. Tumor was found at or close to the bladder neck in 13 (6.5%) female patients, and 2 (1%) patients were found to have short mesentery. The mean follow up period was 90.02 ± 22.63 months. Fatality rate was 2%. Twenty-three (11.5%) patients had early complications, while 36 (23.7%) patients had late complications.

Conclusion: Ileal conduit is still the best urinary diversion method in many patients who have bladder cancer with associated chronic medical disease or certain surgical factors that render other urinary diversion methods more difficult, carry more postoperative morbidity and mortality, or both.

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Bladder cancer is one of the main problems in Urology in terms of diagnosis and treatment due to its high incidence, high recurrence rate, and difficulties in prognosis of its natural history.¹ The ileal conduit has been the standard urinary diversion after radical cystectomy.² The goals of urinary diversion have evolved

from simply diverting the urine through a conduit to an orthotopic reconstruction.³ However, continent urinary diversion requires longer operative time and may require a longer postoperative adjustment period than required of patients undergoing ileal conduit,² besides it is not a suitable option for every patient with bladder cancer depending on certain patient co-morbidities and surgical factors, in addition to the experience of surgeon. In this study, the indication for ileal conduit as a method of urinary diversion following cystectomy for bladder cancer, the postoperative outcome of a single institution, in terms of early and late complications and case fatality ratio, were revised.

Methods. In this retrospective study, 200 patients with bladder cancer, underwent an ileal conduit as a method of urinary diversion following cystectomy for bladder cancer, in Mansoura Urology and Nephrology Center, Mansoura, Egypt between August 1994 and December 2000. The histological grade was determined according to the 1973 World Health Organization grading system,⁴ and tumor stage according to the tumor, node, metastases (TNM) system.⁵ The inclusion criteria involved the presence of certain patient and surgical factors. Patient factors included mainly cardiopulmonary co-morbidities, hepatic cirrhosis, obstructive uropathy with impaired renal function due to (bladder cancer or independent factors such as stone disease or ureteral stricture), poorly controlled diabetes mellitus, and morbid obesity. Impaired renal function was defined as serum creatinine ≥ 2.0 mg/dl. Surgical factors included bladder cancer involving the urethra, the prostate stroma, or both in male patients, tumors at or close to the bladder neck in female patients, difficult cystectomy with severe adhesions to the nearby structures, and short mesentery. Other patients who did not have any of the above mentioned factors were offered a continent urinary diversion or an orthotopic neobladder. Different recognized surgeons in the center performed the cystectomy and ileal conduit. Annual follow-up included history, physical examination, urinalysis, renal function tests, and ultrasonography. Further investigations were requested according to the clinical situation of the patient. Early postoperative complications were considered as those that occurred during hospital stay and late complications were those that occurred later. The patients were followed postoperatively until death, loss of follow-up or until the end of the observation period (September 2006). The choice of ileal conduit as a diversion method for every patient in this study followed the ethical guidelines that ensured the optimum outcome and the study was approved by the Mansoura University.

Technique. A segment 10-15 cm in length is selected 10-15 cm from the ileocecal valve. The ileal mesentery

is transilluminated and a major arcade identified to the segment selected. The peritoneum overlying both sides of the mesentery is incised and mesenteric small arcade vessels are secured either by LigaSure or 3-0 Vicryl ligature. The base of mesentery should be as wide as possible and the mesenteric windows not excessive to prevent ischemia of the segment. The isolated segment is placed caudad and an ileo-ileostomy is performed.⁶ The mesenteric window of the ileo-ileostomy is closed with interrupted 3-0 Vicryl.

Construction of the stoma. A circular plug of skin and subcutaneous fat is excised at the preoperatively marked site. A cruciate incision in the anterior rectus fascia is made and the rectus muscle bluntly split. The hiatus created in the peritoneal cavity should readily admit 2 fingers. This will avoid compression of the conduit mesentery and reduce the risk of parastomal hernia formation. The distal conduit is grasped and delivered through the abdominal wall defect, ensuring that the mesentery is not twisted or stripped. The conduit is secured by fixing the anterior rectus sheath to the serosa of the bowel in 4 quadrants. The border of the stoma is matured to the skin edge, using 3-way bites incorporating dermis, serosa 2 cm from the edge, and full thickness bowel margin. Four such sutures are generally sufficient to achieve eversion of the stoma giving a rosebud fashion and additional sutures may be placed between the dermis and bowel edge, as needed.⁷ A stented uretero-ileal anastomosis is performed in the form of end to end for the left ureter, and end to side for the right ureter. The base of the conduit is fixed to the retroperitoneum in the right lower quadrant by suturing

Table 1 - Characteristics of bladder cancer patients (n=200).

Tumor grade	n (%)
Grade 1 (well differentiated)	49 (24.5)
Grade 2 (moderately differentiated)	113 (56.5)
Grade 3 (poorly differentiated)	38 (19.0)
<i>Tumor stage</i>	
T1	43 (21.5)
T2	52 (26.0)
T3	93 (46.5)
T4	12 (6.0)
<i>Lymph node metastasis</i>	
Negative	167 (83.5)
Positive	33 (16.5)
<i>Carcinoma cell type</i>	
TCC	119 (59.5)
SCC	72 (36.0)
Mixed (TCC and SCC)	1 (0.5)
Adenocarcinoma	4 (2.0)
Undifferentiated	4 (2.0)

TCC - transitional cell carcinoma, SCC - squamous cell carcinoma.

the posterior peritoneum to the conduit, thus effectively retroperitonealizing the ureteral intestinal anastomosis, and it is preferable to suture the loop segment to the lateral peritoneal wall, thus obviating any chance of herniating the small bowel lateral to the conduit.⁶

Statistical analysis. Data were analyzed using mean \pm standard deviation (SD), frequency, and percentage. Case fatality ratio was estimated as the (number of deaths/number of diagnosed patients) \times 100.⁸ The software used in this paper was the Microsoft office Excel 2003.

Results. Two hundred patients aged 29-75 years, with a mean age of 55.84 ± 8.91 years were evaluated. There were 169 (84.5%) males and 31 (15.5%) females. Ileal conduit procedure was used as a method of urinary diversion following cystectomy due to the presence of one of the following patient or surgical factors; 50 (25%) had cardiopulmonary co-morbidities, 27 (13.5%) had liver cirrhosis, 20 (10%) had impaired renal function, 18 (9%) had poorly controlled diabetes mellitus, and 3 (1.5%) had morbid obesity. Frozen section pathological examination showed carcinoma invasion of the urethra in 26 (13%), and prostate stroma in 16 (8%) male patients. Severe adhesions and difficult cystectomy were encountered in 25 (12.5%) patients. Tumor was found at or close to the bladder neck in 13 (6.5%) female patients and 2 (1%) patients were found to have short mesentery. Tumor grade, tumor

stage, pathological lymph node metastasis, and cell-type of bladder cancer are presented in **Table 1**. Radical cystectomy was performed for 181 (90.5%) patients, while 19 (9.5%) patients had salvage cystectomy. The mean hospital stay was 23.76 days. Forty-eight patients were lost from evaluation of late complications. The mean follow up period of the remaining 152 patients was 90.02 ± 22.63 months. The case fatality ratio was 2%. Three patients died during follow-up: 2 of them due to complications of liver cirrhosis 2 and 8 years after surgery, while the third patient died 8 years after surgery due to septic shock complicating uremia. Early and late postoperative complications are listed in **Table 2**. Those occurred early during the period of hospital stay were reported in 23 (11.5%) patients, 8 of them needed surgical intervention as follows; 5 patients with wound dehiscence, 2 patients with conduit infarction, and one patient with persistent urinary leakage not responding to conservative management. Late complications were reported in 36 (23.7%) patients, 8 of them needed surgical intervention. The indications for re-operation among the 8 patients presented with late complications were intestinal obstruction not responding to conservative management in 2 (25%) patients for whom resection of gangrenous segment and reanastomosis was carried out, intestinal obstruction associated with parastomal hernia in 4 (50%) patients treated by resection and reanastomosis with repair of hernia, perinephric abscess in one (12.5%) patient treated by formal surgical drainage, and there was one (12.5%) patient that presented with missed double J stent discovered 2 years postoperatively, extracted through looposcopy.

Table 2 - Complications following cystectomy and ileal conduit.

Complication	Early n=200	Late n=152
Wound infection	11 (5.5)	-
Wound dehiscence	5 (2.5)	-
<i>Intestinal obstruction</i>		
Obstruction associated with parastomal hernia.	-	8 (5.3)
Obstruction without parastomal hernia	-	7 (4.6)
Abscess	4 (2.0)	4 (2.6)
Retracted stoma	-	2 (1.3)
Conduit bleeding	-	4 (2.6)
Conduit infarction	2 (1.0)	-
Stomal stenosis	-	1 (0.7)
Metabolic acidosis	-	9 (5.9)
Urine leak	1 (0.5)	-
Missed double J stent	-	1 (0.7)
Excessive conduit length	-	-
Conduit – enteric fistula	-	-

Data are expressed as number and (percentage)

Discussion. Patients frequently complained about changes in their everyday life after radical cystectomy and urinary diversion.⁹ In choosing the type of urinary diversion, proper patient selection is probably the single most important factor in determining the ultimate success or failure of the procedure.¹⁰ In this study, every patient had certain factors, which dictated the selection of ileal conduit as a method of urinary diversion. Despite the simplicity of conduit compared to continent diversion, complications can occur in a larger percentage of patients. Morbidity rates beyond 30 days range from 28-81%.¹¹ It is difficult to clearly ascribe early and late postoperative complications solely to the creation of the conduit because many are reported in patients undergoing a cystectomy as well.⁶

In our study early postoperative complications were reported in 23 (11.5%) patients while late complications were reported in 36 (23.7%) patients. The most common late complication was bowel obstruction, reported in 15 (9.9%) patients in comparison to

5% in other series.⁶ Recurrent cancer should always be considered in the differential diagnosis in those presenting with late bowel related complications.¹⁰ Problems specifically related to the intestinal conduit can include necrosis, which usually results from acute ischemia of the bowel segment secondary to mesenteric injury, twisting or inadequate blood supply.¹² We faced early conduit infarction in 2 (1%) patients for whom surgical refashioning of a new conduit was carried out, in comparison to 2% in other series.⁶ Stomal complications including (parastomal hernia, stomal stenosis, stomal retraction, and stomal prolapse) are also common and many are preventable and result from technical errors made during construction. However, evaluation of possible risk factors demonstrates that obesity may be a contributing factor in the development of stomal complications, particularly in the elderly.¹³ Most series with long-term follow-up have reported a rate ranging from 25-60%.¹⁰ In other series with at least 12 months follow-up, stomal complications were reported in 15.3%.¹³ In our study, delayed stomal complications were reported in 11 (7.2%) patients, 8 patients with parastomal hernias, 2 patients with retracted stoma and one patient with stomal stenosis. Parastomal hernia after ileal conduit is probably more frequent than many urologists acknowledge, and remains a challenging problem to manage. It usually results from a fascial defect surrounding the conduit. It is a relatively late complication with an estimated incidence of 2-6.5%.¹⁴ Other urologic and surgical literature report an incidence of 5-25%.^{12,15} In our study, parastomal hernia was reported in 8 (5.3%) patients. Subsequent repairs of parastomal hernias are only moderately successful,¹³ and recurrence rates are high.¹⁰

In this study, the frequency of late complications and case fatality ratio may be higher than the estimated figures as 48 (24%) of patients unfortunately were lost at some time during the follow-up assessment of late complications. Also, the development of stomal complications in this study was not compared to the age, gender, body mass index, preoperative laboratory values, or history of abdominal/pelvic radiation therapy between patients with or without such complications. In the future, a prospective study recruiting a larger number of patients undergoing ileal conduit, continent urinary diversion, or orthotopic neobladder, and comparing their late complications with possible risk factors would be recommended.

In conclusion, ileal conduit is still the best urinary diversion method in many patients who have bladder cancer with associated chronic medical disease or certain surgical factors that render other urinary diversion methods more difficult, carry more postoperative morbidity and mortality, or both.

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