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# Ileal Conduit as the Standard for Urinary Diversion After Radical Cystectomy for Bladder Cancer

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**Abstract**

For >30 yr, the ileal conduit (IC) has been considered the "standard" urinary diversion for bladder cancer patients submitted to radical cystectomy. It is universally recognised as being the most clinically adequate, cost-effective, and reliable solution in the long term. During the last two decades, this surgical procedure has been challenged by the dissemination and the excellent clinical outcome of bladder substitutions, which gave the surgeon options in supporting the patient's final choice. Despite this, from a survey of recent literature, IC remains a widely used urinary diversion in most urologic centres. In particular, it is most frequent in female patients and in patients >70 yr with high preoperative comorbidities and unfavourable clinical tumour stage.

Enhanced recovery protocols with standardised perioperative plans of care or "fast-track" approaches as well as advances in postoperative patient surveillance have consistently decreased the overall morbidity related to the IC procedure. Although technically simpler to perform when compared with continent reservoirs, IC has not been associated with lower complications. This can be explained partly by the more unfavourable clinical characteristics of patients who undergo the procedure and partly by technical surgical errors. Postoperative complications strictly related to IC contribute to reduce the postoperative quality of life. These complications include uretero-ileal anastomotic strictures and stomal, peristomal, and abdominal wall-related complications. Most prospective studies, however, found no difference in overall quality of life when comparing different types of transposed intestinal segment surgery.



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## 1. Introduction

Despite recent impressive achievements in radiochemotherapy-related approaches and molecular-based therapies, radical cystectomy (RC) remains the elective treatment for both muscle-invasive bladder cancer (MIBC) and selected non-MIBC cancers [1]. Countless retrospective studies unquestionably support RC's excellent oncologic outcomes and satisfactory postoperative quality of life (QoL) at long-term follow-up. Although much of the clinical evidence coming from these studies is of low quality, major international guidelines strongly recommend RC as the elective treatment for MIBC [2].

Recent improvements in surgical techniques have contributed to favour the patient's acceptance of this major surgery. Technical refinements concerning both extirpative time, including sexual sparing procedures and reconstructive time with novel surgical solutions to divert

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urine, have consistently improved the patient's postoperative QoL.

For >30 yr, the ileal conduit (IC) has been considered the "standard" urinary diversion method for most patients submitted to RC. It is recognised as the most clinically adequate, reliable, and cost-effective solution. In the mid-1980 s, the IC was challenged by the introduction of both orthotopic bladder substitution (OBS) and cutaneous continent reservoir concepts [3]. During the last 20 yr, a variety of surgical OBS improvements have been introduced progressively into clinical practice and proposed more and more often to bladder cancer patients as the best compromise between oncologic radicality and postoperative QoL [4]. This surely advocates for reconsidering the role of IC; therefore, the real question is whether IC should still be considered the standard urinary diversion procedure following RC.

## 2. Ileal conduit in the contemporary era

The IC technique is based on the use of a short segment of ileal bowel to allow urine to traverse the abdominal wall and empty through a cutaneous stoma into a dedicated stoma collection device. The first description of the IC urinary diversion must be attributed to Seiffert [5] in 1935. However, the technique was subsequently refined and popularised by Bricker in the 1950s [6]. Further surgical variants, mainly concerning the ileo-ureteral implant, introduced by Wallace [7], Le Duc et al. [8], Saudin and Pettersson [9], and Taguchi (see Lee et al. [10]), did not substantially change the original technique, which remained the reference for urinary diversion against which all other types of post-RC surgical solutions have been compared and judged.

On the one hand, it has been stated that the major qualifying points of IC are represented by the relatively simple surgical technique and the low rate of inherent postoperative complications. On the other hand, a visible stoma, the need for lifelong stoma care, and the related limitations in terms of social relationships, lifestyle, and leisure activities are well-recognized disadvantages of this procedure [3]. Whether IC is actually an easy-to-perform intervention with overall limited postoperative complications remains a questionable issue. The overall long-term functional results are far from those expected from an ideal procedure [11], and the presence of a visible or malfunctioning stoma could be related to long-life anxiety and depression [12]. The fact is that dissemination of IC diversion and its acceptance in socially advanced countries remain disparate.

According to a recent report by the Urologic Diseases in America Project [13], among 27 494 patients submitted to RC between 2001 and 2005 from the Nationwide Inpatient Sample, 4539 (16.5%) underwent a continent urinary diversion and 22 955 (83.5%) underwent an IC. Interestingly, a significant trend towards the more liberal use of the IC during the last few years has been registered in some US contexts. The monoinstitutional report by Lowrance et al. [14] showed that OBS accounted for 47% of all urinary diversions in 2000 and for only 21% in 2005. Likewise, the recent study by Manoharan et al. [15] showed that of all patients (mean age: 69 yr) submitted to RC between 1992 and 2007 at a department of urology in Miami, Florida, 56% underwent IC and 41% underwent OBS. The trend is similar in many European contexts. The Swedish Bladder Cancer Register study was completed by including >90% of all patients with newly diagnosed bladder cancer treated with RC between 1997 and 2003, and IC and continent reconstruction were accomplished in 64% and 36% of cases, respectively [16]. Likewise, the German population-based study by Bader et al. [17] showed that IC was selected in up to 64% of overall cases after cystectomy. Similarly, a French national survey published in 2008 by the French Association of Urology confirmed the IC as the most frequent post-RC urinary diversion (84%) [18].

This scenario seems to contrast with that at some reference centres where, in the same period of time, a much higher percentage of patients underwent OBS (Ulm, 66%; Bern, 54%; Mansoura, 39% [19]). It clearly emerges that continent reconstructions are more often completed at academic departments than at county hospitals, demonstrating a substantial provider influence on the choice of post-RC surgical solution.

The report published in 2007 by the members of Consensus Conference on Bladder Cancer and the Société Internationale d'Urologie, including >7000 patients from 13 urologic departments [3], probably reflects the current distribution in the frequency of urinary diversions at reference centres. In this report, OBS accounted for 47% (30–66%) and IC accounted for 33% (22.6–64%). It is evident that the rate of patients submitted to any kind of diversion varies widely among high-volume institutions, and very little is known about the reason for this variation. The same study showed that surgical solutions different than IC and OBS are used only marginally in most urologic departments: anal diversion (10%), continent cutaneous diversion (8%), and incontinent cutaneous diversion (2%). When analyzing the mentioned studies, and regardless of the characteristics of the urologic centres, IC unquestionably remains the most frequent approach in female patients and in those >75 yr with less favourable TNM classification.

## 3. Patient preparation

A complete preoperative anaesthesiologic assessment including cardiac testing, renal and hepatic function, and correction of modifiable medical disease such as hypertension, cardiac arrhythmias, and anaemia should be completed in all patient candidates for RC.

During the last decade, enhanced recovery protocols with standardised perioperative plans of care or "fast-track" (FT) schedules have also emerged as tools to assist RC patients. Particularly, the FT protocols incorporate innovative aspects such as non-narcotic analgesics, limited bowel preparation, early institution of an oral diet, and drainage management and have been recognised by many clinical studies [20] as a promising approach in RC followed by the use of intestinal segments.