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In which patients do I perform IRA, and why?

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Introduction

All patients with familial adenomatous polyposis (FAP) will ultimately develop colon or rectal cancer unless their large intestine is resected. This is shown in the high incidence of colorectal cancer in unscreened patients. Studies have shown cancer rates of over 60% in this group of patients [1, 2], with the average age of diagnosis of cancer being 39 years. When consulting an untreated patient with FAP therefore, the decision is not whether to perform colorectal surgery, but rather which surgery to perform, and when.

In my practice, operating on FAP patients since 1989, I have performed 54 primary colectomies with ileorectal anastomoses (IRAs) (62% of primary prophylactic operations for FAP) and 33 primary total proctocolectomies with ileal pouch-anal anastomosis (IPAA). I triage patients towards each surgery depending upon severity of polyposis, and a number of patient-related factors. In this article, the rationale behind the triage is explained.

The surgical options and the aims of surgery

There are three main options for the prophylactic or therapeutic removal of the large intestine. These are: colectomy with IRA, proctocolectomy with IPAA and proctocolectomy with end ileostomy (TPC, I). In considering the relative advantages and disadvantages of these options, it is helpful to be aware of the aims of prophylactic surgery in FAP. Surgery cannot cure FAP; its purpose is to prevent or minimize the risk of cancer. In the large bowel this primary aim is balanced against the effects of surgery on bowel function and lifestyle. This is particularly important in patients diagnosed on screening, who are usually young and who are asymptomatic. Factors influencing the choice of surgery are the risk of colorectal cancer and the status of the patient.

Each surgical option has advantages and disadvantages. These are summarized in Table 1 and are now discussed in detail.

IRA

Colectomy and IRA is a relatively simple and straightforward operation, compared to total proctocolectomy and pouch. There is no pelvic dissection, with its risk of hemorrhage, loss of fertility in women and damage to pelvic structures such as ureters and nervi erigentes. There is only one anastomosis, and there is no routine diverting ileostomy. Complication rates are relatively low [3, 4]. Postoperatively, bowel function is almost always good, averaging 4 semi-formed stools daily [5]. Stool frequency is often well below this if the surgery is done in children. Control of stool is good [5, 6].

The major downside to IRA is the risk of rectal adenomas and carcinomas. Although there is often postoperative regression of the rectal polyposis present at the time of surgery [7], in some patients the adenomas will recur and progress, leading if uninterrupted to cancer.

IPAA

Ileal pouch-anal anastomosis achieves a much greater reduction in rectal cancer risk than IRA. The risk of cancer is not zero however, as adenomas can develop at the anastomosis or below it, whether the anastomosis is accompanied by a mucosectomy or not [8]. Furthermore, it is becoming increasingly obvious that adenomas can develop in an ileal pouch, and do so with increasing frequency and increasingly severe dysplasia as follow-up exceeds 10 years [9–11].

The disadvantages of IPAA include a higher complication rate than that following IRA [3, 4], a need for a loop ileostomy, decreased fertility in women [12], a risk of incontinence and retrograde ejaculation from pelvic nerve damage, and a risk of ureteric injury. Bowel frequency is generally higher than that for an IRA, and hand-sewn anastomosis makes the patient prone to anal seepage and fecal incontinence. In some hands however, IPAA has results that are similar to those achieved with IRA [13, 14].

TPC, I

The only advantages of the TPC, I are that it can provide clear margins when resecting a very low rectal or anal cancer, and that it is also the operation with the lowest risk of recurrent abdominal surgery.

Its major downside is the presence of a permanent end ileostomy.

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Table 1. Summary of indications and contraindication, advantages and disadvantages of surgical options for patients with FAP.

Operation	Indications	Contraindications	Advantages	Disadvantages
IRA	< 1000 colonic adenomas < 20 rectal adenomas	> 1000 colonic adenomas > 20 rectal adenomas Colon or rectal cancer	Easy operation Can be done laparoscopically Good function	Leaves rectum with inherent cancer risk
IPAA	> 1000 colonic adenomas > 20 rectal adenomas Colon or rectal cancer	Poor anal sphincters Advanced rectal cancer mandating APR	Minimal risk of rectal cancer Avoids permanent ileostomy	Still needs adenoma surveillance in pouch Decreased fecundity Bowel function unpredictable Complex procedure May need temporary stoma
TPC, Ileo	> 1000 colonic adenomas > 20 rectal adenomas Poor anal sphincters Advanced rectal cancer mandating APR	Patient prefers anastomosis	Lowest risk of gastrointestinal cancer Lowest risk of complications and need for reoperation	Permanent stoma with effects on body image, ability to perform some jobs. Possibility of stoma dysfunction and hernia

Factors in making the decision

The risk of colorectal cancer

The risk of colorectal cancer is not the same in all patients with FAP. The expression of the *APC* mutation varies according to its location and according to other, less well defined factors. Thus some families have predictably mild or predictably severe polyposis. The ultimate example of mild FAP is attenuated FAP, where there are less than 100 colorectal adenomas visible on conventional endoscopy. Correlations have been established between the severity of polyposis and the risk of colorectal cancer [14], as well as the risk of rectal cancer after IRA [16, 17]. These use the number of 1000 synchronous adenomas to define a severely affected colon, and 20 synchronous adenomas to define a severely affected rectum. Church et al. [17] reported that the risk of proctectomy after IRA is zero if patients originally had less than 5 rectal adenomas and less than 1000 colonic adenomas. In patients with 5–20 rectal adenomas preoperatively the proctectomy rate was 13%, but when there were 20 or more rectal adenomas the proctectomy rate was 54% [17]. Despite these data, some surgeons quote the reported risk of rectal cancer after IRA as one of the main reasons why they advise IPAA almost routinely for all patients with FAP. Studies estimate the risk of rectal cancer in an IRA at 12–43%, depending on the time of follow-up, yet there is a fundamental flaw in these estimates. The flaw is that the data are generated from patients who were operated at a time when the IPAA was not available as an alternative to TPCI. At this time, patients with severe polyposis, who would now undergo IPAA, had to choose between an IRA and a permanent ileostomy. Not surprisingly, many surgeons agreed to perform IRA. The preservation of these 'high risk rectums' has produced artificially high rates of proctectomy and rectal cancer [18]. Patients presenting currently with a 'high risk rectum' now undergo IPAA. To apply the rectal cancer risk measured in patients operated before the era of the pelvic pouch to patients of today with their extra surgical options is false logic.

It is true that some patients are at high risk of rectal cancer. Patients with 'high risk rectums' (more than 20 rectal adenomas, presence of adenoma with severe dysplasia, or a large (> 3 cm) adenoma with predominantly villous histology), or 'high risk colons' (more than 1000 adenomas, colon cancer) need to have total proctocolectomy at the time of their initial surgery.

Patient related factors

The prime consideration in operating on patients with FAP is to minimize the risk of colorectal cancer. In achieving this aim the surgery is primarily driven by the number, size and degree of dysplasia of colorectal adenomas. However there are some situations where patient factors influence surgical strategy.

A successful IPAA depends on reasonably normal anal function. When anal sphincters are damaged by childbirth, trauma or anorectal surgery, IPAA may be unwise. Patients are evaluated individually, using anal manometry and ultrasound when needed.

Patients who have already lost small bowel because of related (desmoid) or unrelated disease may be unsuitable for IPAA because the pouch may not reach the anus, or because there may be a strong tendency to diarrhea.

Some have recommended that poorly compliant patients should not be offered IRA, so that rectal examinations are not necessary. However, as regular pouchoscopy and EGD are almost as important as proctoscopy, likely compliance should not be used to determine surgical strategy.

Similarly, the threat of desmoid disease has been argued as an indication for proctectomy. Yet patients likely to develop desmoids are also likely to have mild polyposis, making proctectomy probably unnecessary. The choice of surgery should be driven by polyp burden, rather than by the threat of desmoids. However the threat of desmoids may prompt delay of surgery.

What about genotype?

There is undoubtedly a relationship between some genotypes in FAP and the severity of colorectal polyposis [19–22]. This is most noticeable at either end of the polyposis spectrum. Attenuated FAP is associated with mutations in exons 3 and 4 (as well as 3′ mutations in exon 15) [23], and profuse polyposis with the 'hot spot' mutation at codon 1309 [20]. In these circumstances the genotype suggests the surgical option: IRA for exon 3 and 4 mutations, and IPAA for 1309. Usually the colorectal polyposis will determine the surgery however, even without identification of the genotype.

Consequences of the decision

Managing the rectum

Patients who have had IRA need to have careful proctoscopy at regular intervals. The timing is determined by the pattern of neoplasia, with a baseline of yearly examinations that could be extended to two-yearly if there are consistently no adenomas found. The most important aspects of proctoscopy are a good preparation and an accurate examination (best with a flexible endoscope). In older patients dysplastic epithelium may not be polypoid, especially if there is scarring from prior polyp cautery. Biopsy of erythematous or otherwise suspicious mucosa is wise. Small (< 5 mm adenomas may be left alone. Large adenomas should be removed and high risk adenomas (severely dysplastic, > 20) should prompt consideration of proctectomy).

Managing the pouch

Yearly pouchoscopy is important to diagnose pouch adenomas. The incidence of pouch adenomas rises with length of follow-up [11]. The other important area to examine is the pouch-anal anastomosis, as both hand-sewn IPAA after mucosectomy, and stapled IPAA are liable to develop neoplasia [8]. The rules for proctoscopy apply equally to pouchoscopy as proctoscopy: excellent preparation and the use of flexible endoscopes. Small diameter scopes work best. Numerous (> 20) or large (> 10 mm) pouch adenomas should be treated with sulindac or celecoxib.

Managing the ileostomy

Ileostomy neoplasia occurs in a small number of patients with FAP [23], although ignorance of the denominator makes its actual incidence hard to determine. The time to ileostomy neoplasia is quite long however, and inspection of the stoma at intervals is relatively easy to do.

Summary

The risk of colorectal cancer in patients with FAP is not uniform. It is determined by genotype and by other factors less easily identified. The risk is quite accurately reflected in the severity of colorectal polyposis, however, enabling patients to be triaged into IRA or IPAA. The less radical surgery is simpler, less complicated and has better function than the more radical procedure, although patients needing IPAA still have good quality of life and high degrees of satisfaction.

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