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Original Article

Functional outcomes in patients submitted to restorative proctocolectomy with ileal pouch anal anastomosis in a single tertiary center

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ABSTRACT

Background: Functional results after restorative proctocolectomy for ulcerative colitis and familial adenomatous polyposis are variable. We assessed functional results in patients with ileal pouch anal anastomosis and evaluated potential factors associated with poor functional results.

Methods: Retrospective cohort study of 38 patients who were submitted to a restorative proctocolectomy with ileal pouch anal anastomosis, in the context of ulcerative colitis and familial adenomatous polyposis, in at tertiary referral center, in the period between 1993 and 2013. Clinical records were analyzed and telephone interviews with protocoled questionnaire to 32 patients (12 ulcerative colitis, 20 familial adenomatous polyposis) were performed. Pouch functional results were also evaluated based in the Oresland score. The functional results were analyzed at four points of the patient outcome.

Results: In 25 patients were performed restorative proctocolectomy with ileal pouch anal anastomosis and in 7 patients total colectomy preceded protectomy with ileal pouch anal anastomosis. Protective ileostomy was performed in all patients. There was no mortality and post-operative complications related with the pouch was 12.5% but treated conservatively. The mean follow-up was 13.2 years. Pouch failure occurs in 9.4% (2 in familial adenomatous polyposis and 1 in ulcerative colitis). Familial adenomatous polyposis patients achieved the best outcome but the outcome was acceptable in both groups. The median Oresland score was good with small variations over the years, although the best score being reached at 5 years after the surgery.

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Conclusions: The long-term results in patients undergoing restorative proctocolectomy with ileal pouch anal anastomosis were good in both groups, although better in familial adenomatous polyposis. In both, the best score of functional results seems to be reached at 5 years after surgery.

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Resultados funcionais em pacientes submetidos a proctocolectomia restauradora com anastomose íleoanal e bolsa ileal em um centro terciário

Palavras-chave:
Anastomose íleoanal e bolsa ileal
Resultados funcionais
Polipose adenomatosa familiar
Colite ulcerativa
Doença de Crohn

RESUMO

Introdução: Os resultados funcionais após proctocolectomia restauradora em casos de colite ulcerativa e polipose adenomatosa familiar são variáveis. Avaliamos os resultados funcionais em pacientes com anastomose ileoanal e bolsa ileal bem como os fatores potenciais associados a resultados funcionais fracos.
Métodos: Estudo retrospectivo de coorte com 38 pacientes submetidos a proctocolectomia restauradora com anastomose ileoanal e bolsa ileal, no contexto de colite ulcerativa e polipose adenomatosa familiar, em um centro de referência terciário, no período entre 1993 e 2013. Analisamos os registos clínicos e realizamos entrevistas telefónicas com um questionário protocolado a 32 pacientes (12 colite ulcerativa, 20 polipose adenomatosa familiar). Também foram avaliados os resultados funcionais da bolsa, com base no escore de Oresland. Os resultados funcionais foram analisados em quatro pontos do desfecho de cada paciente.
Resultados: Em 25 pacientes foi realizada proctocolectomia restauradora com anastomose ileoanal e bolsa ileal, e em 7 pacientes uma colectomia total precedeu a protectomia com anastomose ileoanal e bolsa ileal. Todos os pacientes foram submetidos a uma ileostomia protetora. Não ocorreram óbitos e as complicações pós-operatórias relacionadas com a bolsa chegaram a 12,5%, mas foram tratadas conservadoramente. O seguimento médio foi de 13,2 anos. Ocorreu defeito na bolsa em 9,4% (2 em polipose adenomatosa familiar e 1 em colite ulcerativa). Os pacientes com polipose adenomatosa familiar obtiveram o melhor resultado; contudo, em ambos os grupos o resultado foi considerado aceitável. A mediana do score de Oresland foi boa, tendo sido observadas pequenas variações ao longo dos anos, embora o melhor score tenha sido verificado 5 anos após a cirurgia.
Conclusões: A longo prazo, os resultados para os pacientes submetidos a proctocolectomia restauradora com anastomose ileoanal e bolsa ileal foram bons em ambos os grupos, embora tenham sido considerados melhores nos pacientes com polipose adenomatosa familiar. Nos dois grupos, o melhor escore de resultados funcionais parece ser alcançado por volta dos 5 anos após a cirurgia.

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Introduction

First described by Nissen in 1933 and recovered by Parks and Nicholls at the St. Mark's Hospital in 1978,[1] the total proctocolectomy with ileal pouch anal anastomosis (IPAA) still remains the treatment of choice in selected patients with ulcerative colitis (UC) because of premalignant nature of the disease and refractory to medical therapy in some cases, and familial adenomatous polyposis (FAP). This surgery allows to suppress the underlying disease as well reducing the risk of colorectal cancer, keeping fecal continence.

The confection of an ileal pouch anal anastomosis as an alternative to a definitive ileostomy seems to provide good long-term functional results (FR), despite all the pouch-inherent morbidity. This potential morbidity ranges from the anastomotic leak, abscess/pelvic sepsis or hemorrhage, which may occur in the immediate postoperative period, to late complications as pouchitis, anastomotic stricture, pouch failure and sexual–urinary dysfunction.

In most studies, functional results are excellent, regardless of the underlying pathology, even for Crohn's disease (CD).[2,3] These results seem to decline in the long term but its etiology is not clear and may be related with the aging process.[4]

In this study, we pretend to evaluate the functional results in patients with IPAA and analyze potential factors associated

with poor functional results, such as underlying pathology, surgical technique and IPAA aging.

Material and methods

Ethics approval

The study was approved by the Ethics Committee of Hospital Center of Porto and patient informed consent for this study was obtained verbally during the telephone interview. The interview was conducted only by one observator (ACS), after patient informed of research objectives, methods, risks and benefits.

Patient population

Retrospective study of 38 patients consecutively submitted to IPAA for 20 years, from January 1993 to December 2013, at Santo António Hospital (HSA), at the University Hospital Center of Porto. All patients with more than 15 years old and submitted to one of the followed procedures: total proctocolectomy with ileal pouch anal anastomosis or total colectomy followed by total proctectomy with ileal pouch anal anastomosis were included, if none of the following exclusion criteria were met: patients with/or residual recto, protective ileostomy that has not been closed, difficulty in understanding the questionnaire and lost or deceased during the follow-up.

Methods and parameters assessed

For the study, the medical records of patients were consulted and patients were contacted by telephone and interviewed. The following variables were analyzed: patient demographic data, preoperative diagnosis, surgery indications, surgical procedures performed, operative findings, pathological report, postoperative morbidity and duration of hospital stay. There was also registered IPAA kind, anastomosis type (manually or stapled), operative time, postoperative morbidity, interval to closure of the ileostomy and clinical follow-up for stool frequency (day and night), degree of continence and genitourinary and sexual function.

Based in these information set, the Oresland score[5] was applied and registered for each patient.

All variables were entered into a computerized database.

Definitions of postoperative and long-term morbidity and IPAA functional quality

Postoperative complications were graded according to the Dindo–Clavien classification 2004.[6] Surgical site infection was defined according to the Centers of Disease Control guidelines.[7] When clinical or subclinical anastomotic leaks were suspected, the diagnosis was confirmed by imaging study (CTscan or WS contrast) or by reoperation.

Long-term morbidity (symptoms present for twelve or more months after surgery) was divided in:

Major: when anism, difficulty of pouch emptying, severe fecal incontinence (regularly severe leakage or fecal loss passive fecal incontinence) and pouch failure with pouch excision or proximal shunt due to malfunction were present.

Minor: pouchitis, irritable pouch syndrome, anastomotic stricture with increase of defecation frequency, mild fecal incontinence (soiling or spotting in underwear), urinary and sexual dysfunctions.

The Oresland score comprises 11 parameters, evaluating the 24-h stool frequency, night time defecation, the urgency of defecation, use of pad, soiling, peri-anal soreness, dietary restrictions, regular medication for stool regulation and social handicap.[5] The sum of these parameters ranges from 0 to 15, with 0 being the best and 15 the worst score. The value obtained in Orland score allow us to classify the pouch functional result in three groups: good (score of 0–4), moderate (score 5–7) and poor (score 8–15).

Statistical analysis

Relationships between Oresland score and patients demographic variables, diagnosis, surgery and per operative complications at 1, 5, 10 and 15 years were analyzed with chi-square statistics. Statistical analysis was performed using IBM SPSS statistics version.

Results

A. Population characteristics

This study gathered 38 consecutive patients submitted to surgery with IPAA between 1993 and 2013. After exclusion of 4 patients deceased (hemorrhagic stroke, pancreatic carcinoma, lung carcinoma and prostate carcinoma) and 2 more patients lost during the follow-up, 32 patients were included in the present analysis. The indications for surgery are summarized in Table 1. Among the 32 patients, 20 were diagnosed with familial adenomatous polyposis; of those, 3 of them with carcinoma. The remaining 12 were diagnosed with 3 inflammatory bowel disease unclassified (IBDU) and 9 ulcerative colitis; Of the 3 patients with IBDU, one of the patients presented fistula 8 years after the initial surgery and the histological examination relieved CD. The diagnosis of Crohn's disease was made in 3 of 9 patients with ulcerative colitis, years later after the IPAA confection, through the appearance of pouch erosions, stenosis anastomosis and fistula.

Table 1 – Pathology and indications for surgery.

Pathology	*n*
FAP	20
- With adenomas	17
- With adenomas and carcinoma	3
UC/IBDU	12
- Refractory to medical treatment	9
- Severe bleeding	1
- Toxic megacolon	1
- High-grade dysplasia	1

Table 2 – Description of study population and surgical parameters.

Sex (male, female)	14; 18
Age at operation (years) (mean ± SD)	33 ± 12.3
Body mass index (kg/m^2) (average)	23.6
Diagnosis (FAP and neoplasms; UC and IBDU)	20; 12
Resection type (2-stage procedure; 3-stage procedure)	25;7
Pouch type ("J"; "S")	25; 7
Anastomosis (hand-sewn; stapled)	17; 15
Laparoscopic surgery (no; yes)	26; 6
Operative time (minutes) [median (range)]	277.5 (180–676)
Morbidity (Clavien-Dindo II/III)	9 (28%)

FAP, familial adenomatous polyposis; UC, ulcerative colitis; IBDU, inflammatory bowel disease unclassified.

B. Immediate surgical results

In Table 2 are summarized population characteristics and surgical parameters. 32 patients were operated with a median age of 33 years (range = 15–65 years). The male to female ratio was 1:1.28. The surgery was performed in the majority of cases (25 patients) in 2-stage procedure, in the first stage total proctocolectomy with ileal pouch anal anastomosis and protective ileostomy, and a second phase, the manual closure of the ileostomy. In 7 patients (21.9%) surgery was performed at 3-stage procedure. The type of pouch was "J" shaped in 25 patients and "s" shaped in 7. The anastomosis was manual in 17 cases and with mechanic device in 15. All patients underwent protective ileostomy. We had no mortality, and immediate morbidity related with IAPP was 12.5%; treated with conservative therapeutic.

In the following tables, the results already account for patients whose diagnosis was modified for Crohn's disease.

Table 3 shows the postoperative morbidity related with pathology.

Table 4 shows the post-operative complications related with the pouch: three patients with small anastomosis dehiscence (2 FAP and 1 CD) and with one bleeding (FAP). All treated conservatively.

Table 3 – Postoperative complications (<30 days) related with pathology.

Classification Clavien-Dindo	No. of patients (32)	Pathology		
		FAP (20)	UC (8)	CD (4)
Grade I	4	1	3	–
Grade II	8	6	1	1
Grade IIIb	1	1	–	–

Table 4 – Postoperative IPAA complications related with pouch.

	No. of patients (32)	FAP (20)	CD (4)	UC (8)
Complications	4	3	1	–
Anastomosis leak	3	2	1	–
Anastomosis bleeding	1	1	–	–

C. Long term surgical results

The closure of ileostomy was at a mean of 4.7 months (rage = 2–48 months) and the mean follow-up of these patients was 13.2 years (range = 27–270 months).

The long-term IPAA complications were divided into major and minor complications, and are presented in Table 5.

In the minor complications of IPAA, pouchitis and increasing the number of daily stools were present in 11 and 8 patients, respectively. The first episodes of pouchitis occur with a median of 7 months (8.6 months of mean) after IPAA. Sexual activity was reduced by 21.9% (7 patients), and urinary disorders occurred in 2 patients (6.3%).

In major complications, pouch failure occurred in 3 patients with need of pouch removal in one patient with CU (3.1%). Adenomas with high-grade dysplasia in another pouch (HGD) forced a second removal pouch.

The functional results are shown in Table 6. The number of bowel movements per day in most patients was less than 5, being 81.2%, 75.0%, 72% and 44.4% at 1 year, 5, 10 and 15 years, respectively. The patients referred absence of night bowel movements at night in 53.1%, the 1st year after

Table 5 – Long-term IPAA complications related with pathology.

Complications	No. of patients (32)	FAP (20)	UC (8)	CD (4)
Major complications				
Anism, difficulty of intubation or dysfunction pouch	3 (9.4%)	2 (10.0%)	1 (12.5%)[a]	–
Excision pouch	2 (6.3%)	1 (5.0%)(HGD)	1 (12.5%)[a] (dysfunction)	–
Minor complications				
Increase of frequency of defecation per 24 h	8 (25.0%)	6 (30.0%)	1 (12.5%)	1 (25.0%)
Pouchitis	11 (34.4%)	4 (20.0%)	3 (37.5%)	4 (100.0%)
Irritable pouch syndrome	5 (15.6%)	4 (20.0%)	1 (12.5%)	–
Stenoses	4 (12.5%)	1 (5.0%)	1 (12.5%)	2 (50.0%)
Sexual dysfunctions	7 (21.9%)	4 (20.0%)	1 (12.5%)	2 (50.0%)
Urinary dysfunctions	2 (6.3%)	1 (5.0%)	1 (12.5%)	–

[a] Patient with pouch dysfunction which led to its excision.

Table 6 – Functional outcome and quality of live in patients with ileal pouch-anal anastomosis.

(a) Discrimination of Orsland score

Parameters of Orsland score	1 yr (n = 32) %	5 yr (n = 32) %	10 yr (n = 25) %	15 yr (n = 18) %
24-h stool frequency (score)				
<5 (score = 0)	81.2	75	72	44.4
5–8 (score = 1)	18.8	18.8	16	38.9
>8 (score = 2)	0	6.2	12	16.7
Night time defecation (score)				
Never (score = 0)	53.1	56.2	48	27.8
Weekly (score = 1)	6.3	0	8	33.3
Every night (score = 2)	40.6	43.8	44	38.9
Urgency of defecation (score)				
>30 min (score = 0)	96.9	96.9	96	83.3
10–30 min (score = 1)	3.1	3.1	4	5.6
<10 min (score = 2)	0	0	0	11.1
Use of pad daytime (score)				
No (score = 0)	100	100	100	77.8
Yes (score = 1)	0	0	0	22.2
Use of pad at night (score)				
No (score = 0)	93.7	90.6	96	66.7
Yes (score = 1)	6.3	9.4	4	33.3
Soiling or seepage during daytime (score)				
No (score = 0)	96.9	100	100	77.8
Yes (score = 1)	3.1	0	0	22.2
Soiling or seepage at night (score)				
No (score = 0)	75	86.4	84	66.7
Yes (score = 1)	25	15.6	16	33.3
Peri-anal soreness (score)				
No (score = 0)	96.9	93.8	80	50
Occasional (score = 1)	3.1	6.3	20	44.4
Permanent (score = 2)	0	0	0	5.6
Dietary restrictions (score)				
No (score = 0)	93.7	87.5	80	72.2
Yes (score = 1)	6.3	12.5	20	27.8
Regular medication for stool regulation (score)				
No (score = 0)	75	78.1	80	94.4
Yes (score = 1)	25	21.9	20	5.6
Social handicap (score)				
No (score = 0)	93.7	93.7	92	88.9
Yes (score = 1)	6.3	6.3	8	11.1

(b) Functional groups based in Orsland score

Functional Oresland score	Functioning	1 yr (n = 32) %	5 yr (n = 32) %	10 yr (n = 25) %	15 yr (n = 18) %
0–4	Proper	87.5	81.2	84	61.1
5–7	Moderate	9.4	18.8	8.0	22.2
8–15	Poor	3.1	0.0	8.0	16.7

surgery. This result was slightly inferior at the 15th year of follow-up (38.9%). After 15 years of follow-up other symptoms appeared: urgency of defecation less than 10 min (11.1%), soiling day (22.2%) and overnight (33.3%). Also dietary restrictions increased over the years, from 6.3% in the first year to 27.8% at 15 years. On the other hand, the use of medication to normalize stools decreased over time to 5.6%.

The median functional Oresland score was 2 in the first year, 1 to five years, 2 at 10 years and 3–15 years.

Table 7 shows that the 12 variables do not have statistical significant relation with long term functional pouch results.

Discussion

Early and long-term morbidity related ileal pouch procedure is frequent and can be present until 50% of the patients.[8]

Our postoperative morbidity was similar to the other series, namely in concern related IAPP complications (9.4% leak and 3.1% bleeding of anastomosis line). In fact, anastomotic leak and bleeding after IPAA in several published studies, have an incidence varying from 5 to 19% and 1.5% and 3.5%, respectively.[9] In our series, this post-operative morbidity

Table 7 – Relationships between Oresland score and patients demographic variables, diagnosis, surgery and per operative complications at 1, 5, 10 years – *p*-values.

Variable	Global result	Score 1 (1-year)	Score 5 (5-year)	Score 10 (10-year)	Score 15 (15-year)
Sex	.53	.20	.70[a]	.67[a]	.69[b]
Age	.42	.93	.37[b]	.52[b]	.60[a]
ASA	.85	.71	.16[a]	.23[a]	.73[b]
CMI	.93	.32	.70[a]	.16[a]	.019[a]
					.065 with correction of continuity
Post surgical diagnosis	.76	.93	.47[a]	.86[a]	.49[b]
Pouch	.96	.32	.049[a]	.27[b]	.71[b]
			.22 with correction of continuity		
Anastomosis type	.30	.17	.62[a]	.95[a]	.29[b]
Surgery procedure	.09	.44	.34[a]	.41[a]	.71[b]
Laparoscopy	.21	.48	.03[a]		
			.14 with correction of continuity	–	–
Surgery time	.42	.85	.11[a]	.10[a]	.74[a]
Surgeon	.77	.55	.93[a]	.57[a]	.045[b]
					.16 with correction of continuity
Per operative complications	.42[a]	.58	.49[b]	.59[b]	.18[a]

[a] 50% have expected values <5.
[b] 75% have expected values <5.

related with the pouch was not greater when an inadvertent IPAA for Crohn's disease was made. Mayo clinic series[3] of 37 patients who underwent Crohn's IPAA confirm this result. In our series, we had no mortality. Our results are in agreement with a meta-analysis of 96 observational studies were mortality range from 0 to 2.9%.[10] Pouchitis is a non-specific inflammatory condition in the ileal pouch reservoir and almost exclusively occurs in patients with underlying UC and IBDU and is rarely seen in patients with FAP. A substantial increase in the risk of pouchitis was seen in patients with UC (30.1%) compared with those with FAP (5.5%), in a meta-analysis performed by Lovegrove.[11] It is the most common long-term complication after IPAA, occurring in 35.6%[12] to 47%[13] of the cases. In our series we had 34.4% of pouchitis (at least one episode throughout the follow-up), with favorable antibiotic response not needing hospitalization in none of cases. We had pouchitis in 37.5% UC patients and in 20% FAP patients. All 4 patients with CD had this complication and all of them had more than 2 episodes. Murrel, in a prospective study comparing 98 IC and 236 UC patients undergoing IPAA, did not found statistically significant differences in the incidence of pouchitis, fistula, abscess or stenosis between groups.[14] In our series we cannot relate the long term pouch complications with statistical significance, to the patient pathology, pouch shape or anastomosis type, because the sample is very small and refers to a very long period of time, although it seemed to be larger in DC. In recent decades, pouch failure rates have declined due to better patient selection and improved surgical techniques. In a St. Mark's study, this rate went from 16.5% to 8.3%.[15]

Long-term functional IPAA results and quality of live are our main concern. Ideally, the pouch should present with less than 6 bowel movements per day, no night bowel movements and continence maintained as in the large published series.[16] In our serie, the number of daily bowel movements and the continence gets worse over the years. This is an unexpected result and was also noted in the UK National Ileal Pouch Registry.[16]

In a review of 2012, mild and severe fecal incontinence during the day was 14.3% (CI, 7.3–25.9) and 6.1% (2.9–12.3), respectively.[10] In our cases, we had 6.3% of nocturnal fecal incontinence, one patient who removed the bag and another with CD and a transsphincteric pouch fistula resolved later.

The deterioration of functional pouch with aging is a known problem. Our patients after one year were 87.5% of proper functioning of the pouch, and this number decreased to 84% at 10 years and 61.1% at 15 years follow-up. In a study of the viability and functional results of ileal pouch anal with mechanical anastomosis with staple modified double, Ya-Jie Zhang et al., 79.2% cited good functioning, 16.7% moderate and 4.2% poor functioning at 5 years.[12] We obtained very similar results at 5 years: 81.2%, 18.8% and 0%, respectively. Bullard found that 18% of patients suffered a measurable deterioration of functional outcome, of the 235 who underwent a questionnaire to evaluate these results, especially 12 or more years after surgery,[17] our group found a deterioration at 15 years. Once again, we cannot found predictive factors capable to explain functional pouch deterioration due to the limitations in our study. The retrospective nature and the small number of patients prevents that factors like patient age at the operation, pathology and surgical technique have statistical significance.

Conclusion

In our single center series, the majority of patients undergoing restorative proctocolectomy with ileal pouch anal anastomosis in FAP and UC had a relative low morbidity. Pouchitis was our most frequent long term complication but with favorable antibiotic response. The functional long-term results were reasonable with the best score of functional results reached 5 years after surgery and the worst after 15 years of follow-up.

At this time of follow-up the continence and number of bowel movements get considerably worse. Therefore, the deterioration of functional pouch with aging is an actual problem even with the improved surgical techniques. So, the identification of the factors responsible for this issue remains a priority in this area of medicine.

Conflicts of interest

The authors declare no conflicts of interest.

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