International Journal of Surgery 12 (2014) 1088–1092

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Original research

Pathophysiology, clinical presentation and management of diversion colitis: A review of current literature

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HIGHLIGHTS

- Diversion colitis is a non-specific inflammation of a de-functioned segment of intestine after diversion of the faecal stream.
- Epidemiological studies are limited; in-spite of this an incidence rate of 100% has been shown in some studies.
- Up to 33% of patients with a stoma may have symptomatic diversion colitis.
- The absence of any characteristic pathognomonic features makes it difficult to diagnose and appearances can be similar to IBD.
- Severely symptomatic patients will benefit form re-anastamosis of the diverted faecal stream.

ARTICLE INFO

Article history:
Received 27 May 2014
Received in revised form
9 August 2014
Accepted 12 August 2014
Available online 20 August 2014

Keywords:
Diversion colitis
Disuse colitis
Lymphoid follicular hyperplasia
Short chain fatty acid

ABSTRACT

Introduction: Diversion colitis is a non-specific inflammation of a de-functioned segment of intestine after diversion of the faecal stream. **Aim**: The aim of this study was to review the current level of knowledge about diversion colitis. **Methods**: A literature search of relevant literature in the English language was carried out on PUBMED, MEDLINE and EMBASE. The following keywords were used: diversion colitis; disuse colitis; proctitis; colonic bacterial flora; stoma; de-functioned colon; faecal diversion; short chain fatty acids and lymphoid follicular hyperplasia. **Results**: In total 35 articles met the inclusion criteria. 22 were case series, 9 were case reports, 2 were retrospective analysis and 2 were prospective randomized controlled studies. Diversion colitis is invariably present in all diverted segments of the colon. It is usually asymptomatic but can present with tenesmus, rectal discharge, bleeding per rectum and abdominal pain. Major macroscopic changes include mucosal nodularity, erythema and friability. Microscopic features are predominantly those of lymphoid follicular hyperplasia, apthous ulceration and chronic inflammatory changes, mostly limited to sub mucosa. Treatment modalities include surveillance for asymptomatic patients, restoration of bowel continuity for severely symptomatic cases and the use of short chain fatty acid (SCFA) enemas in selected cases. **Conclusion**: The clinical presentation of diversion colitis varies significantly. In symptomatic patients short chain fatty acid enema may help. Further prospective studies are required for evaluation.

1. Background

'Diversion colitis' is a relatively new term. It was first mentioned by Basil Morson and Dawson [1] in 1974 as a non-specific inflammation limited to the mucosa in the de-functioned segment of the colon. However, it was David Glotzer who coined the term 'diversion colitis' after publishing a case series of 10 patients in 1981 [2]. Since then this entity has been described in both retrospective and prospective studies which have described the characteristic clinical, endoscopic and histo-pathological findings. However till date the precise pathogenesis of this condition remains unclear.

Diversion colitis is usually asymptomatic and therefore its incidence may be under-estimated. Epidemiological studies are limited; in-spite of this an incidence rate of 100% has been shown in some studies with a manifestation time period of 4 weeks to 3 years post index surgery [3]. Up to 33% of patients with a stoma may present with symptoms of diversion colitis. These symptoms include lower abdominal discomfort, pelvic pain, anorectal pain,

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http://dx.doi.org/10.1016/j.ijsu.2014.08.350
1743-9191/

mucous discharge, tenesmus, per rectal bleeding and low grade fever [4,5].

The absence of any characteristic pathognomonic features, both macroscopically and microscopically, makes it difficult to differentiate from active inflammatory bowel disease [6]. This presents a diagnostic dilemma for clinicians, especially when it comes to decision on re-anastomosis for patients who have diversion colitis against a background of inflammatory bowel disease.

2. Methods

The systematic review was carried out with reference to the validated AMSTAR (Assessment of Multiple Systematic Reviews) measurement tool [7].

A literature search was performed using multiple electronic search engines including PUBMED, MEDLINE and Cochrane Database. The search was limited from January 1950 till January 2013. The following keywords were used for the title/abstract search: diversion colitis; stoma; SCFA; colonic bacterial flora; defunctioned colon; lymphoid follicular hyperplasia; disuse colitis and faecal diversion. The keywords were used in mixed combinations to get the greatest possible combination.

The "related articles" function was also used to identify additional studies. The reference sections of relevant articles were also searched for, first by title and subsequently by abstract review. Combination, truncation and explode functions were used where appropriate to give the search a good depth.

All published studies reporting diversion colitis were considered. No restriction on type of study was imposed. Data was extracted on author, date of publication, study design and technical aspects of the studies. Restrictions were made to include relevant English language studies only.

The following outcomes were reviewed:

1. Demographics, type and indication of surgery, time from index surgery, underlying pathology
2. Epidemiology, aetio-pathogenesis, clinical symptoms, endoscopic and microscopic finding of diversion colitis
3. Investigation modalities, complications and treatment options relating to diversion colitis

Inclusion criteria:

1. All patients with surgical diversion of the faecal stream
2. Report on at least one of the outcome measures mentioned above.

Exclusion criteria:

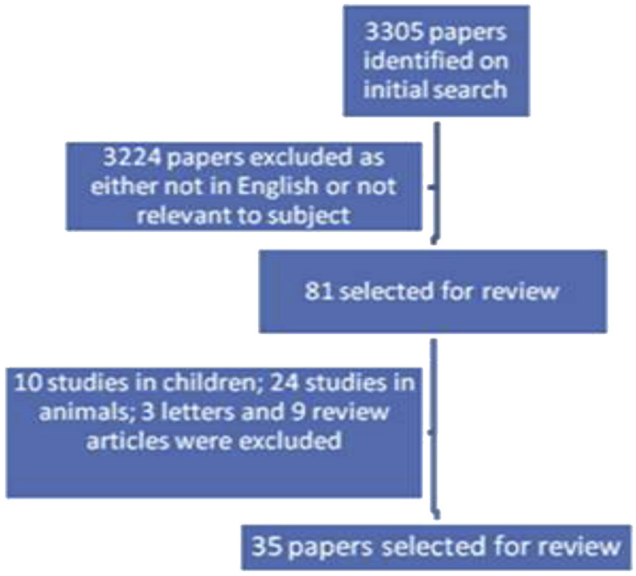
1. Study population based on children less than 19 years of age
2. Animal studies
3. The language used was not in English

3. Results

The literature search revealed 3305 articles. The title and abstract were reviewed by three independent researchers. This resulted in 3224 articles being rejected as they did not meet the criteria for inclusion. 81 articles were selected for further scrutiny. PRISMA diagram (Table 1) illustrates the selection of articles for the review.

In total 35 studies were included in the final analysis; this comprised two randomized trials, two retrospective studies, twenty two case series and nine case reports.

Table 1
PRISMA diagram for research strategy.



4. Incidence

Majority, if not all patients who have undergone diversion of the faecal stream may either have macroscopic or microscopic evidence of colitis [8–10]. This ranged from 91% in patients with pre-existing inflammatory bowel disease [10,11] and 70%–74% in patients without pre-existing inflammatory bowel disease [8,9]. More recently a study from Poland described a 90% incidence of diversion colitis on endoscopy in a series of 145 patients [5], this study suggested that there was no significant association between diversion colitis and sex, age, type of stoma or mode of surgery performed.

Only one study has reported on the prevalence of diversion colitis in asymptomatic patients with endoscopically normal mucosa. This was a prospective study in 20 patients which reported a prevalence of 100% [12].

5. Pathogenesis

Glotzer [2] in his report on 10 patients hypothesized that it might be the result of bacterial overgrowth, presence of harmful bacteria, nutritional deficiency, toxins or disturbance in the symbiotic relationship between luminal bacteria and the mucosal layer; however there was no data to support any of his hypotheses.

It has been reported that concentrations of carbohydrate fermenting anaerobic bacteria and pathogenic bacteria are reduced in de-functioned colon [12,13]. This suggests that overgrowth of anaerobic bacteria or a pathogenic bacterium is unlikely to be a significant aetiological factor.

However there is an increase in nitrate reducing bacteria in patients with diversion colitis [14]. Nitrate reducing bacteria are involved in the production of nitric oxide (NO). NO plays a protective role in low concentrations but at higher levels it becomes toxic to the colonic tissue [45]. This increase in nitrate reducing bacteria may result in toxic levels of NO resulting in diversion colitis but more studies are required to confirm this hypothesis.

Recently ischaemia has been proposed as a cause of diversion colitis [15]. Levels of Short Chain Fatty Acids (SCFA) in de-