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ANASTOMOTIC LEAK AFTER ELECTIVE COLORECTAL SURGERY: OUR EXPERIENCE

***Ahmed Ahmed and *Ayan Banerjea**

*Colorectal Surgery Department, Nottingham University Hospitals NHS Trust, UK.

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***Correspondence for Author**

Dr. Ahmed Ahmed

Colorectal Surgery Department, Nottingham University Hospitals NHS Trust, UK.

ABSTRACT

Background: Anastomotic leak is still one of the most devastating complications leading to high morbidity and mortality rates in recent decades. Knowledge about predictors, CT scan Complication detection, clinical diagnosis, risk factors to CAL is vital to its early detection, decision making for surgical time, managing preoperative risk factors, and postoperative complications. **Objective:** The purpose of this study was to identify patient, utilities, predictors, risk factors that may predispose patients to anastomotic leak after colorectal surgery. **Methods:** This was a prospective observational, quality improvement study in 182 patients undergoing colorectal resection in a single institution with the main outcome being anastomotic leakage (AL) within 30 days postoperatively. **Results:** Of the 182 patients. The mean age of the patients was 61±17, male 56% and the mean body mass index was 25.9 kg/m2. Of them, 41.2 % (75) patients had colo-colic surgery, 24.7% (45) had entero-enteric surgery and 34.06% (62) patients had ileo-colic surgery. Of all 11 (9+2) patients, 10 were diagnosed with anastomotic leak clinically. Complications detected on CT scan: ileus, leak, collection (pelvic, intra-abdominal), bowel perforation, wound infection, adhesion bowel obstruction. **Conclusions:** Multiple clinical predictors, Ct utilities, surgical intervention should be considered before and during the surgical care of colorectal patients.

KEYWORDS: Colorectal surgery, CT modality, Complications, Postoperative care, Anastomotic leakage, early detection.

INTRODUCTION

Despite many advances in surgery, the quest for prevention and early detection of the intestinal anastomotic leak remains a challenge after colorectal surgery. The prevalence of

anastomotic leak has been reported to be between 0.5% and 21% after colon and rectal resections.[1] Anastomotic leakage after colorectal resection is a dreaded complication and is reported to have a significant mortality 6%-22%.[2] It has a serious impact on the patient's life quality, as may lead to a permanent stoma in 56%.[3] Recently many strategies aimed at lowering the incidence of anastomotic leakage have been investigated.[3] However, multiple factors, predictors, anastomotic techniques, intensive clinical observation, biochemical parameters, radiological evaluation, risk scores, surgical intervention were considered in detection of early anastomotic leaks after the colorectal surgery.[4]

Many definitions are used to describe anastomotic leakage.[5] Anastomotic leak in this study was defined as leakage of bowel content and/or gas from the surgical connection between the 2 bowel ends into the abdomen or pelvis with either spillage and/or fluid collection around the anastomotic site or extravasation through a wound, drain site[6] clinical manifestation causing fever, abscess, septicemia, peritonitis, and/or organ failure; and[7] confirmation by imaging technique (i.e. computerized tomography scan). A CAL detected by imaging study only but not clinically manifested was recorded as an "asymptomatic" Radiological Anastomotic Leak.

In the present study radiological CT modality, surgical and clinical evaluation were investigated aiming to identify high risk patients, very easily and to early detect of anastomotic leakage in order to lower its incidence before its clinical presentation.

METHOD

Prospective database for patients who underwent elective laparoscopic or open bowel resection, and anastomosis at Queens Medical Center, Nottingham, UK (A tertiary colorectal center) from January 1, 2013 to June 30, 2013, were reviewed. A record of a complete follow-up data form at the time of follow-up in the outpatient clinic to record any readmissions or complications after initial hospital discharge were analysed. All recorded complications, other than anastomotic leak, were also reviewed.

All the coded datasheets of all patients who underwent a laparoscopic/open bowel resection and anastomosis were scrutinized for complications. Postoperative abscesses were reclassified as a leak if there was extravasation of enteric contrast on an imaging study, there was significant perianastomotic air, or communication with the anastomosis was noted after radiologic drainage.

Patients who were transferred from outlying hospitals with a leak, abscess or fistula were excluded unless they redeveloped the complication after surgery at our institution. Demographics (age, gender) and anastomotic category (entero-enteric, colo-colic, ileo-colic) were recorded. The postoperative day the leak was diagnosed was noted along with the primary method of diagnosis (clinical or radiological). Differences in the leak rate by anastomotic location and the positive predictive value of computed tomography scanning (CT) were assessed using a Fisher exact test.

The post operative day the leak was diagnosed was noted along with the primary methods of diagnosis (clinical or radiological). The results of any radiologic studies were recorded as was patient outcome. The incidence of leak by surgical site, type of anastomosis, timing of postoperative CT scan, diagnosis of leakage were collected before, during, and after the surgery and entered into an electronic database created on Microsoft Excel (Microsoft, Redmond, USA). All other findings were ascertained, and analysed using Fischer's exact test.

RESULTS

In this study a prospective database was reviewed over a 7-month period (Jan.–June, 2013).

1-Demographics characteristics (age, gender), BMI and data completeness were shown in **Table 1. Mean age was Mean age 61±17, male 56%**

Table 1-Population characteristics and data completeness

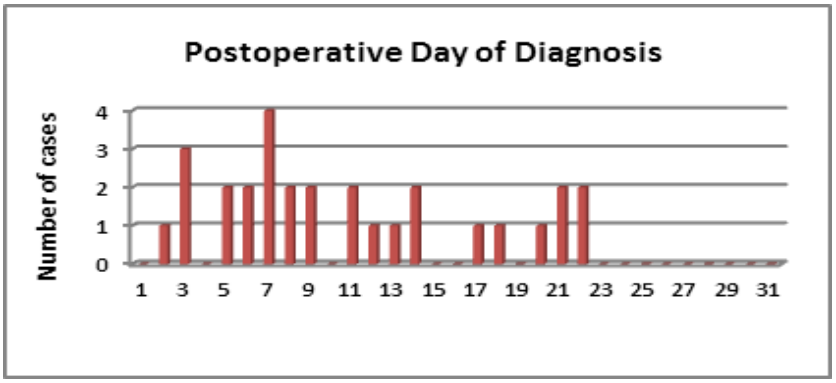
Variable	Total study population (n=182)	Missing data (%)
Age (years)	61±17	0
Sex		
Male	56% (101)	0
Female	44% (81)	
BMI	24.8 (22.4-27.8)	23

2- **Radiologic studies were recorded as was patient outcome**

Radiological parameters regarding CT- scanning parameters: all parameters regarding CT scanning such as total number of patients who did scanning time of scanning, patient's time incidence of scanning whether at the time of initial admission or after discharge and readmission, were recorded in Figure 1.

Findings showed that total number of patients who performed CT-scans were 86 at different times. Of all the 54 (29%) patients had post-op CT scan and only 48 patients (89%) of them had first post-op CT during same admission. The mean days between post-op and CT was

5±3 days. In addition, 9 (17%) patients had post-op CT on readmission following discharge within 30 days and the mean days between post-op and CT was 14±8.



3- Clinical evaluation, Complications and morbidity

A total of 182 patients underwent resection. The anastomosis category during the 6-month between the 6-month study period was 75 colo-colic, 45 entero-enteric, and 62 ileo-colic. Leaks occurred in 33 patients (2.7%). Diagnosis was made a mean of 12.7 days postoperatively, including four beyond 30 days (12.1%). The anastomotic category were recorded and presented in table-2.

Table 2-Incidence of clinical leaks by Type of Anastomosis (n=182)

Anastomosis	% age	Leaks
Enteroenteric	24.7%	45
Colocolic	41.2 %	75
Ileocolic	34.06%	62

Detection and diagnosis: patients were diagnosed for Complications clinically or evidence of post-op complication on CT. Findings using CT scan were 32 patients (32/54, 59%) had evidence of post-op complication on CT. Nine patients had definite evidence of anastomotic leak. Two patients were query anastomotic leak. Of all 11 (9+2) patients, 10 were diagnosed with anastomotic leak clinically. Of all 10 confirmed leak, 5 had invasive intervention, 5 were managed conservatively. The mean days between post-op and confirmed diagnosis of leak was 14±8.

Complications detected on CT scan were ileus, leak, collection (pelvic, intra-abdominal), bowel perforation, wound infection, adhesion bowel obstruction. The maximum number of CT scans: 6 (patient had anterior resection: leak and had multiple pelvic collections). Regarding the number of deaths, it was only one reported death in this series of leak detected on CT scan day 6 (patient had anterior resection). Moreover, there were complications

detected on CT scan 35 of which 8 needed interventions (laparotomy and radiological drainage).

Table- Morbidity and Complications detected on CT scan:

Complications	Number of patients (%)
Colorectal anastomotic leakage	10 (10.9)
Pelvic abscess	1 (1.0)
Adhesion Bowel Obstruction	2 (1,0)
Bowel Perforation	2 (1.3)
Abdominal Wound infection	1 (1.0)
Anterior resection	6(7.1)
Laparotomy and radiological drainage	8 (21.1)
Leak and had multiple pelvic collections	4. (4.3)
Surgical re-intervention	12 (13.0)

DISCUSSION

The rate of clinical anastomotic leakage after colorectal anastomosis in the current study is comparable to the 6.5%–18% rate reported in recent studies.[8-9] Anastomotic leakage can be caused by multiple factors such as: gender; preoperative radiation therapy; bowel preparation; anastomosis level; surgeon's experience; anastomotic technique; protecting stomas; peritoneal sepsis; duration of surgery; the presence of chronic disease, and nutritional status.[10-12] However, the clinical importance of these isolated different factors remains uncertain.

Anastomotic leakage was defined as clinically significant leakages requiring surgical intervention. Thus, all leakages were verified at reoperation. Anastomotic leakage typically becomes clinically apparent between the 5th and the 8th postoperative day, but many exceptions exist, with one study even reporting a mean of the 12th postoperative day for the diagnosis of anastomotic leakage. Clinical signs of systemic inflammatory response syndrome, fever, ileus and pain are frequent but have low positive predictive value for CAL, when observed separately. In a study by den Dulk et al [13] these clinical features were combined into a clinical scoring system (Dutch Leakage Score), with which patients were scored daily in a systematic and uniform way. Points are attributed to certain clinical symptoms (i.e., fever, heart rate), nutritional status (signs of ileus, gastric retention, type of intake) and laboratory findings [i.e., C-reactive protein (CRP) level, leucocytes, kidney function].

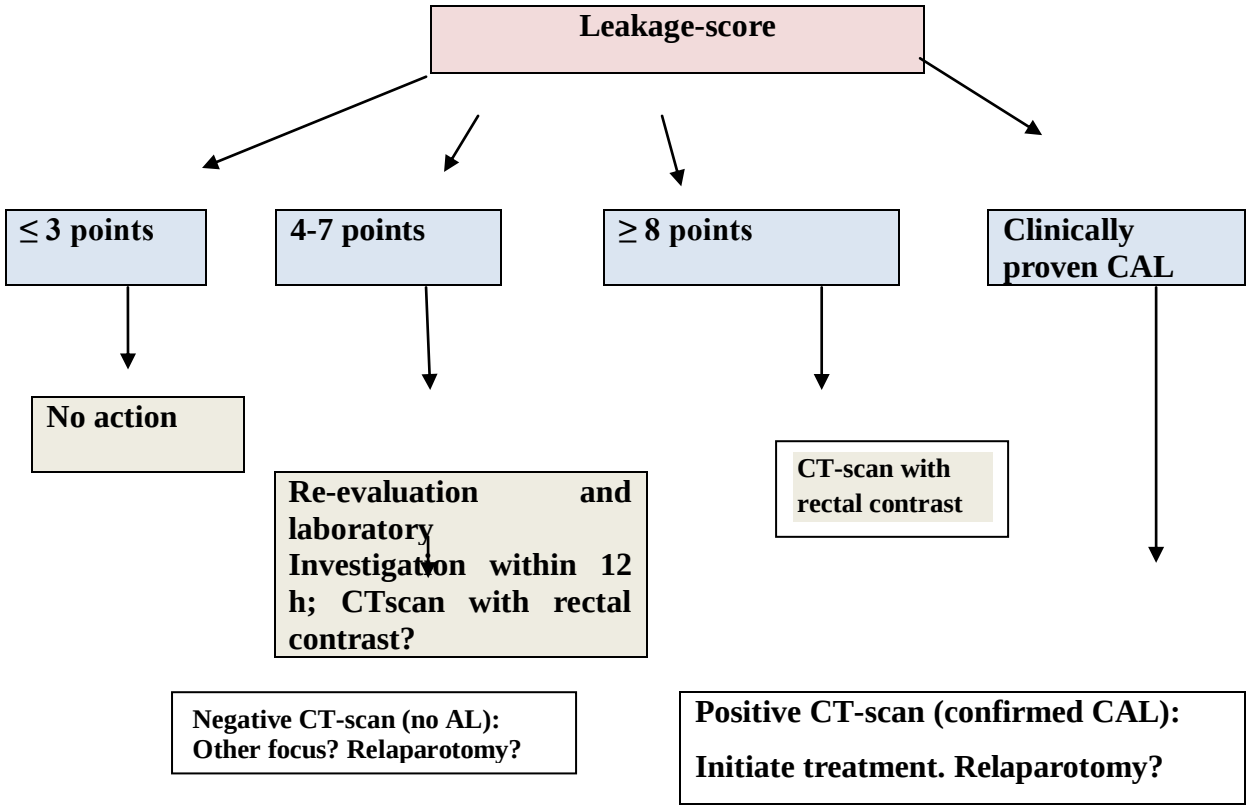


Figure 2: The Dutch Leakage Score. According to the points attributed to the patients on the basis of clinical symptoms, treating doctors can follow this diagnostic flowchart. Reprinted from den Dulk *et al*. CT: Computed tomography; AL: Anastomotic leak.

Strength and weakness of the study

Limited number of patient and the short term period contribute to weakness of the study. Although AL has been an outcome variable in many studies, identifying early detection strategies for AL utilizing CT scan modality has not been the primary focus. The large spectrum of colorectal diseases, the variety of surgical and medical treatment modalities, different surgical anastomotic technologies, and not least of all, lack of a universal definition for AL contribute to the complexity of studying only one utility. As a consequence, there are no established guidelines for early detection of AL before its clinical presentation and surgical treatment nor is there solidly established strategy.

CONCLUSIONS

All colorectal surgeons are faced from time to time with anastomotic leakage after colorectal surgery. This complication has been studied extensively without a significant reduction of incidence over the last 30 years. In recent decades many strategies have been investigated for early detection of anastomotic leaks. CT scan, in conjunction with clinical judgment, is the

preferred diagnostic modality. This can lead to reduction in delay of diagnosis and will help in identifying high risk patients, very easily and consequently, lowering the incidence of CAL.

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