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## **The Role of Plain Radiographs in the Diagnosis of Delayed Anastomotic Leak: A Case Report from a Resource Limited Setting**

Ruhama Imana (MD)\*

*Assistant Professor of General Surgery, Department of Surgery, Adama Hospital Medical College, Adama,  
Oromia Region, Ethiopia  
Email: ruhjos@gmail.com*

### **Abstract**

Gastrointestinal surgery related anastomotic leaks are one of the serious causes of morbidity and mortality in the postoperative period. The rate of expected anastomotic leak depends on the location of gastrointestinal tract anastomosis. The expected leak rate for small intestinal anastomosis is 1-3%. There are several factors that are attributed to leakage of small intestinal anastomosis. Anastomotic leaks usually present within days after surgery. Late presentations more than 30 days after surgery are uncommon. This case report is a prototype example of delayed presentation of anastomotic leak of the small intestine done on an 18 years old male patient. Plain radiograph was used for the timely diagnosis and management of the case. High index of clinical suspicion and early surgical management of delayed anastomotic leaks is recommended in resource limited settings for the better outcome of such patients.

**Keywords:** Anastomotic leak; Plain abdominal X-ray; Delayed anastomotic leak.

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\* Corresponding author.

## **1. Introduction**

Gastrointestinal surgery related anastomotic leaks are one of the serious causes of morbidity and mortality in the post-operative period. Intestinal anastomosis in a resource limited country like Ethiopia remains to be done hand sewn with absorbable suture materials. Even in facilities where stapler anastomosis is done, leaks remain to be the most feared and troublesome complications. The rate of expected anastomotic leak depends on the location of gastrointestinal tract anastomosis. The expected leak rate for small intestinal anastomosis is 1-3 %. [1] There are several factors that are attributed to leakage of small intestinal anastomosis. They include patient related systemic and local factors, factors related to the presentation of the case, and factors related with the intervention done. Anastomotic leaks usually present within days after surgery. Nevertheless, late presentations more than 30 days after surgery have been reported. [2] Plain radiographs remain to be essential tools for the diagnosis of delayed leaks especially in resource limited settings. The following case is a prototype example of delayed presentation of anastomotic leak of the small intestine which was managed in a third world country setup.

## **2. Case Report**

The patient is A.A an 18 years old male patient who had laparotomy and small intestinal resection (200cm of gangrenous ileum) and end-to-end hand sewn anastomosis done for gangrenous small bowel obstruction secondary to small bowel volvulus 6 weeks prior to his current presentation. During the previous admission he had uneventful post-operative course and later he was discharged to home with improvement.

At his current presentation, he came with acute abdominal pain of 3 days duration that was associated with few episodes of vomiting of ingested matter. He also complained abdominal distension and failure to pass feces and flatus. On examination his pulse was 118 beats/min, respiratory rate was 20 breaths/min, SpO<sub>2</sub> was 97% with atmospheric air and Blood pressure was 112/77 mmHg. His temperature was in the normal range. The abdomen had a healing long midline surgical scar and was slightly distended, tender and tympanic to percussion. The rest of the examinations were unremarkable.

Laboratory investigations revealed WBC count of 4400/uL with neutrophil of 59.1% and lymphocyte of 27.4%. His hemoglobin was deranged (10.3 g/dL). He had moderate hypokalemia. His organ function tests were within the normal limits. Plain abdominal X-ray showed pneumoperitoneum and an air-fluid level that crosses the abdomen. With the diagnosis of generalized peritonitis from delayed anastomotic leak, the patient was prepared and laparotomy was done. The intra-operative findings were 3 L of thick pus in the general peritoneum and inter-loop adhesions. The previous anastomotic site was located on the terminal ileum with local adherence to the sigmoid colon and had perforation on one side which was sized 0.5 by 1 cm with minimal surrounding spillage of intestinal content. After sucking out the pus and intestinal content, refreshment of the perforation site and suture repair was done in double layers. Abdominal lavage was done with copious normal saline and the abdomen and it was closed in layers. Patient was followed post-operatively and was managed for the moderate hypokalemia and anemia. He was discharged improved at his 18th post-operative day.



**Figure 1:** Plain abdominal X-ray of patient showing free gas in the general peritoneum and an air-fluid level crossing the abdominal cavity.



**Figure 2:** Intra-operative picture showing anastomotic leak site.

### 3. Discussion

Anastomotic leak is defined as discharge of intestinal content from anastomosis site to the peritoneal cavity evident by discharge through abdominal wound or drains, and/or presence of signs of peritonitis such as fever, leukocytosis, or intraabdominal fluid collection as seen by abdominal ultrasonography. [3]

The ‘early’ anastomotic leaks occur within the first two post-operative days and they are prototypically caused by technical failure. The ‘intermediate’ ones occur after 5-6th post-operative day and they are attributed to

failure of the normal healing mechanism. The rate of leaks depends on the various locations of the gastrointestinal tract where the anastomosis is done. [1]

There are systemic and local risk factors that predispose to failure of anastomosis by causing poor wound healing. Systemic conditions include anemia, hypoalbuminemia, diabetes and presence of other comorbidities, malnutrition, smoking history, chemotherapy and prolonged steroid therapy. [3] Local factors associated with anastomotic leak include irradiation of the bowel, inflammatory bowel disease, and intestinal ischemia. [3]

Additionally, there are external factors related with the type of presentation of the patient and interventions given that affect the outcome of anastomosis. These include emergency presentation, technique of anastomosis, increased operative time, intra-operative transfusion, and mechanical bowel preparations. [3]

The presentation of the current case is an example of delayed anastomotic leak that was diagnosed 6 weeks after the initial surgery. There were no identified risks that predisposed the patient for anastomotic leak except for the presence of mild anemia. There are reports of delayed anastomotic leak, which can occur 30 days after the surgery. [2] A case was once reported to have of delayed anastomotic leak which occurred as late as 16 months post-surgery. [1]

The diagnosis of general peritonitis from possible anastomotic leak was made pre-operatively in this case due to the presence of clinical signs of sepsis and abdominal complaints which was supported by radiologic evidence of pneumoperitoneum. Patient had insidious abdominal pain associated with vomiting, mild abdominal distension and tenderness. None of these symptoms are sensitive and specific for the diagnosis of anastomotic leak. However, the presence of signs of sepsis such as tachycardia and leukopenia together with abdominal tenderness raised the index of suspicion. Studies report that fever and tachycardia along with sudden abdominal pain are presented by early leaks, on the other hand late leaks present with fever associated insidious abdominal pain. [4] A number of authors emphasize unexplained fever and tachycardia should raise suspicion of a leak complicating an anastomosis. [1] Many studies also agree signs of sepsis such as tachycardia, fever, hypotension, leukocytosis/penia, and signs of peritonitis are important clinical clues for suspecting anastomotic leak.[5] Tachycardia above 120 beats/min is considered a strong indicator of systemic compromise after leak. [6] However in the current patient the typical sign fever was absent. Many authors recommend demonstration of the site of anastomotic leak with oral contrast studies (gastrografin follow-through), or abdominopelvic CT scan done with oral and intravenous contrasts. [1, 3, 5] The role of CT with IV and oral contrast in the early diagnosis of anastomotic leak cannot be over emphasized. [7] However, in the case of delayed leaks presenting with overt signs of sepsis clinical signs should guide the diagnosis and decision making. Post-operative pneumoperitoneum on plain radiographs, even though a normal physiologic finding following the introduction of air during surgery, it can often be an indicator of anastomotic leak or gastrointestinal perforations. [8, 9] In the absence of CT scans in a resource limited setting, plain radiographs can be helpful in diagnosing anastomotic leakage. [7] There was evidence of significant collection of peritoneal air on the plain radiograph of the patient as it can be seen on Figure 1. A study was conducted to determine the incidence of post-operative pneumoperitoneum, and its association with anastomotic leakage. The findings were that a pneumoperitoneum with an initial air height >11.7 mm was significantly associated with anastomotic leakage. [10] Additionally, increasing air height over

time, and the presence of ileus on plain radiographs suggested a high likelihood of anastomotic leakage. [10]

The morbidity and mortality associated with intestinal leak is significant. Favorable outcomes of patients with anastomotic leak rely on early detection of the leak. [1] Accordingly, the high index of suspicion and early management of this patient has contributed for the prevention of more serious complications. Nevertheless, patient had a prolonged time of recovery with 18 days in-hospital stay.

#### 4. Conclusion

Delayed anastomotic leak is a rarely reported complication of intestinal anastomosis. Pneumoperitoneum on plain radiographs can be an essential clue in the diagnosis of such cases. High index of clinical suspicion and early surgical management is recommended in resource limited settings for the better outcome of such patients.

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