

## Case Report

# A rare case of isolated preperitoneal necrotizing myofasciitis: a diagnostic dilemma in the absence of cutaneous signs

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## ABSTRACT

Surgical infections are a diverse group of conditions including intra-abdominal infections, necrotizing soft tissue infections (NSTI's), and abscesses, contributing significantly to global morbidity and mortality, often necessitating surgical or procedural intervention for cure. Isolated extraperitoneal and retroperitoneal NSTI's are uncommon. We present a rare case of an adult male in mid-thirties with isolated anterior infraumbilical preperitoneal necrotizing myofasciitis, in the absence of any known etiological factors for NSTI's. Patient presented with severe abdominal pain of 1 day duration, with no complaints of urinary symptoms, vomiting, constipation or obstipation. Laboratory investigations showed metabolic acidosis with leukocytosis. Radiological investigations including abdominal X-ray and plain abdomen & pelvic CT (computed tomography) showed air foci in the extraperitoneal space with no evidence pneumoperitoneum. Radical debridement was done via exploratory laparotomy; intraoperatively necrotic tissue was present in extraperitoneal space with no evidence of injury to hollow viscus or urinary bladder. Post operatively patient was managed in intensive care unit (ICU), received HBO (hyperbaric oxygen) therapy and was followed up on outpatient basis.

**Keywords:** Necrotizing myofasciitis, Extraperitoneal, Absent cutaneous signs

## INTRODUCTION

Necrotizing soft tissue infections (NSTI's) are rapidly progressing skin and soft tissue infections associated with necrosis of the dermis, subcutaneous tissue, superficial fascia, deep fascia, or muscle. This definition includes a variety of conditions, such as Fournier gangrene affecting the perineum and genitalia, Meleney Streptococcal gangrene, and Clostridial myonecrosis.<sup>1</sup>

These usually present with external clinical signs such as swelling, skin discolouration, crepitus, redness. Extraperitoneal infections are rare conditions that develop in the space between the peritoneum and the surrounding fascia-either anteriorly, retroperitoneally, or within the pelvic region. The common etiological factors for such infections are perforation of hollow viscus, emphysematous cystitis trauma, malignancy, post invasive procedures, post COVID-19 infection,

immunocompromised patients.<sup>2-4</sup> Very rarely it may be idiopathic. The absence of visible clinical signs, the presence of anatomical obstacles to effective debridement, and the coexistence of comorbidities collectively make this condition particularly challenging to treat.

## CASE REPORT

A 35-year-old male came to emergency department with chief complaints of severe abdominal pain, fever and breathlessness for 1 day. Patient had no complaints of vomiting, constipation, obstipation, urinary symptoms, blunt trauma or similar complaints in the past.

Patient has a history of right sided percutaneous nephrolithotomy six years ago for right renal calculi. On clinical evaluation, the patient exhibited tachypnea with a respiratory rate of 32 breaths per minute, tachycardia

with a pulse rate of 110 beats per minute, a systolic blood pressure of 110 mmHg, was alert and oriented, and showed no signs of fever. On per abdominal examination there was diffuse tenderness and rigidity over all quadrants, more in periumbilical and suprapubic region mimicking peritonitis due to perforation. Early resuscitation started by securing two wide bore intravenous access, ~1L of crystalloid (0.9% normal saline) and empirical antibiotic (meropenem and clindamycin) administration in view of SIRS (systemic inflammatory response syndrome).

Ryles tube and foleys catheter were inserted with around 50ml urine output in the first hour. Laboratory investigations suggested metabolic acidosis with base deficit of -6, raised WBC count (15,300) and raised creatinine level (2.5). These findings were indicative of start of SIRS (systemic inflammatory response syndrome). Viral markers (HIV, HbsAg, HCV) were negative and patient was non diabetic with HbA1c of 5.7. Abdominal X-ray showed air foci in pelvis and around lateral abdominal wall, however there was no gas under diaphragm or air fluid levels (Figure 1).

Plain abdomen and pelvis CT was done which was suggestive of air foci within the retro-rectus and preperitoneal space below the arcuate line extending below till pubic bones and laterally till psoas fascia, no evidence of pneumoperitoneum or bowel gangrene present, large bowel was also within normal limit (Figure 2,3).

Patient underwent emergency exploratory laparotomy via midline incision. Intraoperative findings confirmed isolated necrotizing myofasciitis involving medial edges of rectus muscle, posterior rectus sheath (PRS), preperitoneal fat below the arcuate line covering the urinary bladder and part of peritoneum covering over the bladder with presence of black necrotic material with foul smelling pus. No evidence of urinary bladder or any solid organ involvement (Figure 4).

Debridement was done and all the necrotic tissue including rectus muscle, PRS, preperitoneal fat were excised, lateral margin till white line of Toldt's on each side, bilateral inferior epigastric artery found thrombosed.

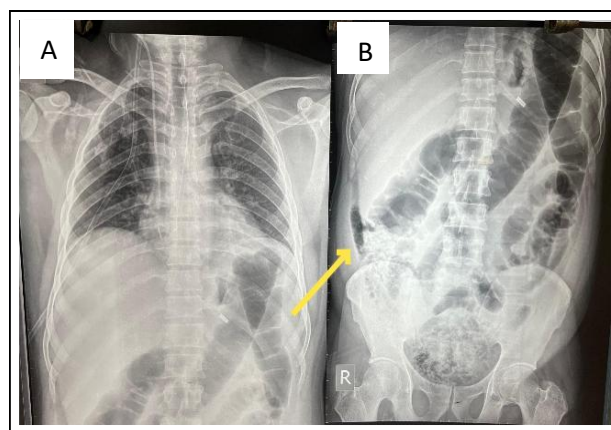
The continuity of the urinary bladder wall was confirmed by retrograde filling with 150 cc of methylene blue; no leaks were detected (Figure 4C). Abdominal drains were placed, right in Morrison's space and left in pelvis. Abdominal closure done using tension band wiring empirically in view of extensive debridement of PRS.

Patient was on ventilatory support VC (volume controlled) mode for 2 days post operatively. Patient was monitored in surgical ICU was gradually weaned off and extubated on post op day 4(POD 4). Nutrition was gradually initiated through a nasogastric tube starting on

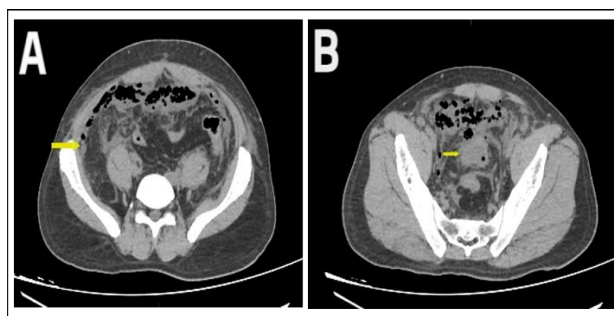
postoperative day 2 and later transitioned to an oral diet following extubation and was shifted to ward.

Necrotic tissue tested negative for gas gangrene. Tissue and pus cultures isolated organisms *Escherichia coli* and *Proteus mirabilis* and initial antibiotic meropenem and clindamycin shifted to piperacillin-tazobactam, metronidazole, gentamycin and levofloxacin as per sensitivity. Post operative abdomen & pelvis CT done with intravenous (i.v) and oral contrast on POD 7 revealed no air foci, collection in preperitoneal space, intact bowel and bladder (Figure 5).

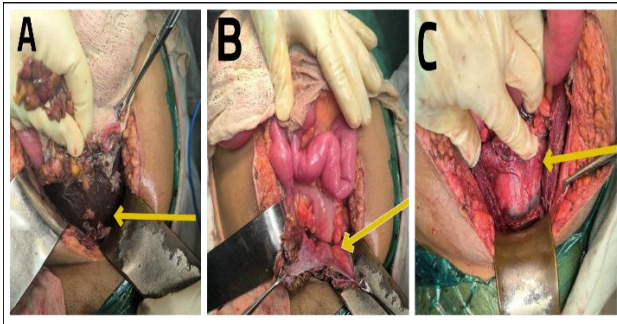
Bilateral basal lung consolidations present on chest cuts on postoperative abdominal CECT for which chest physiotherapy was given. Patient received 3 sessions HBO therapy and was kept on high protein diet. No repeat debridement was required. Patient was discharged after stabilization with abdominal drains in situ and was followed up on outpatient basis.



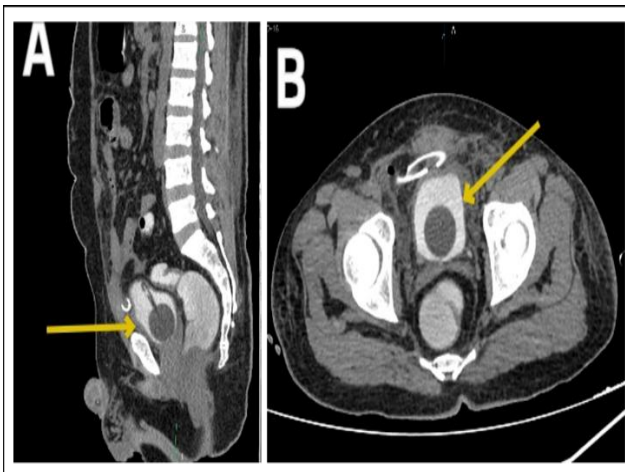
**Figure 1: (A, B) Chest X-ray, Abdominal X-ray showing bilateral subcutaneous air in the flanks (yellow arrow).**



**Figure 2: Axial cuts of preoperative plain abdominal CT show air loculi with fluid collection and fat stranding suggestive of necrosis in the preperitoneal space between the rectus muscle and parietal peritoneum below the umbilicus extending till lateral abdominal wall (yellow arrow). (A) Preperitoneal necrosis along anterior wall of urinary bladder (shown by yellow arrow) with intact bladder wall (B).**



**Figure 4: Intraoperative findings showing black necrotic material in preperitoneal space along anterior wall of urinary bladder and intact parietal peritoneum (yellow arrows) (A, B). Intact urinary bladder wall post retrograde filling of methylene blue (yellow arrow) (C).**



**Figure 5: Postoperative abdomen and pelvis CECT with i.v and oral contrast sagittal (A) and axial (B) cuts showing intact urinary bladder (yellow arrows), no contrast leak from bowel, minimal to nil air foci and collections in preperitoneal space.**

VARIABLE	UNITS	SCORE
C-reactive protein	≥150 mg/L	4 points
White blood cell count	15–25	1 point
(per mm)	>25	2 points
Hemoglobin	11.0–13.5 g/dL	1 point
	<11 g/dL	2 points
Serum sodium	≥135 mmol/L	1 point
	<135 mmol/L	2 points
Serum creatinine	>1.6 mg/dL (or >141 pmol/L)	2 points
Serum glucose	>180 mg/dL (or >10 mmol/L)	1 point
RISK CATEGORY	LRINEC SCORE, points	PROBABILITY OF NSTIS, (%)
Low	≤5	<50
Intermediate	6–7	50–75
High	≥8	>75

**Figure 6: LRINEC (Laboratory risk indicator for necrotizing fasciitis) scoring system.**

## DISCUSSION

Necrotizing myofasciitis is a rare soft tissue infection characterized by extensive necrosis of the subcutaneous tissue and fascia. There is accompanied systemic inflammatory response syndrome (SIRS) and needs prolonged intensive care in most cases. Most common pathogens involved are group A hemolytic streptococcus and *Staphylococcus aureus*, although many other aerobic and anaerobic organisms may be present such as *Bacteroides*, *Clostridium*, *Pepto streptococcus*, *Enterobacteriaceae*, *Proteus*, *Pseudomonas* etc. Microorganisms release endo- and exotoxins that lead to sustained vasoconstriction and thrombosis of the perforating vessels supplying the skin and subcutaneous tissue. Later, progresses to SIRS, septic shock, multiorgan dysfunction syndrome (MODS) and ultimately death.<sup>5</sup>

According to Sarani et al necrotizing fasciitis can be polymicrobial fasciitis (type I) or monomicrobial fasciitis (type II) which can be associated with crepitant or non-crepitant myonecrosis 6. It may be primary (idiopathic) or secondary to a known etiological agent. However, in our case there was no any predisposing factors which were present.

Clinically necrotizing infection of abdominal wall or retroperitoneum may present with intense abdominal pain, brown discoloration and bullae of abdominal skin, gases in soft tissue, abdominal rigidity with history of predisposing agent. In this case though patient had abdominal rigidity, no external clinical findings of skin and soft tissue involvement were seen making clinical diagnosis difficult to make when presents only with features of peritonitis. Additional diagnostic modalities in the form of various scoring systems, radiological investigations may be required. Widely used scoring system for NSTI is LRINEC (Laboratory risk indicator for Necrotizing fasciitis) scoring system (Figure 6).<sup>1</sup>

These are not specific for NSTI but are accurate indicators of mortality. Radiological investigations including X-ray and Ct scans will show necrotic collections with air foci in the fascial planes as was seen in our case in preperitoneal area. Management starts with early fluid resuscitation and intensive care admission. Empirical antibiotics are started and radical serial debridement's are usually needed. HBO therapy has proved to be a useful adjunct in treatment of NSTI, if gas gangrene is positive further anti gas gangrene serum has to be administered.

Mohamed et al suggested that lymphopenia linked to COVID-19 infection could increase the patient's susceptibility to necrotizing fasciitis and subsequent secondary infections.<sup>3</sup> Retrospective medical records of last 5 years showed a similar case where there was pus and necrotic material in the retro-rectus plane communicating till the left ischio-rectal space.<sup>2</sup> Despite the

high mortality rate associated with this infection, survival is achievable through timely and repeated extensive surgical debridement, thorough necrosectomy, and appropriate broad-spectrum antibiotic therapy. The postoperative risk of hernia formation versus the necessity of life-saving debridement presents a double-edged sword that clinicians must carefully navigate. Also, this article may help further managing cases of similar type, as literature is lacking.

## CONCLUSION

Preperitoneal necrotizing myofasciitis is a rare and uncommon condition that is difficult to diagnose prior to surgical exploration, primarily because of the absence of skin changes on the abdominal wall. A high index of suspicion is often necessary, and imaging techniques can be valuable in facilitating early diagnosis and timely intervention. There should be further studies for developing scoring systems for diagnosing necrotizing myofasciitis.

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