Open Access Journal of
Gerontology & Geriatric Medicine
ISSN: 2575-8543

Juniper Publishers
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Editorial
Volume 3 Issue 2 – February 2018
DOI: 10.19080/OAJGGM.2017.03.555609

OAJ Gerontol & Geriatric Med

The Etiologies behind the Scenes in Elderly Infection

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Submission: February 02, 2018; **Published:** February 06, 2018

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Keywords: Necrotizing Fasciitis; Thigh; Cecum; Carcinoma

Abbreviations: ED: Emergency Department; WBC: White Blood Cell; CRP: C-Reactive Protein; CT: Computed tomography; AST: Aspartate Amino Transferase; BWL: Body Weight Loss; FOLFIRI: Folinic acid, Fluorouracil, and Irinotecan; ECOG: Eastern Cooperative Oncology Group

Introduction

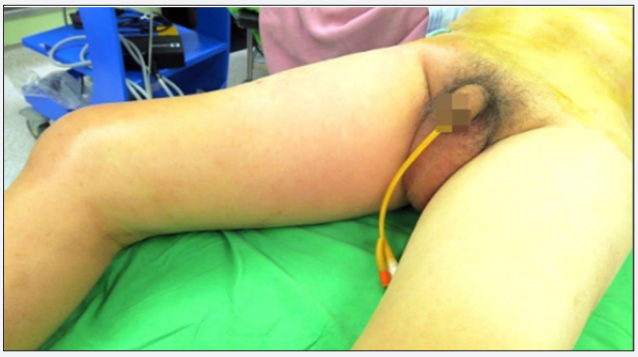

Figure 1: Swelling, erythematous and mild tenderness with crepitus over the right thigh.

Fever with lethargy, even altered mental status is commonly seen in daily practice, especially in infected elderly. Recently we saw a 63 years old man who complaints of right thigh redness and tenderness for two days. But the etiology behind the scenes is perforated cecal tumor. Prudent workup of infectious source is mandatory to prevent from misdiagnosis. We also briefly review the literatures of necrotizing fasciitis of thigh secondary to perforated colon cancer. This old man went to our emergency department (ED) and said he also felt right back pain and difficulty in standing for one week. There was no symptom of fever, abdominal pain, nausea and vomiting, recent weight neither loss nor bowel habit change. His vital signs showed body temperature of 36°C, respiratory rate of 20 breaths per minute, pulse rate of 93 beats per minute and blood pressure of 92/54 mm Hg. Physical examination revealed swelling, erythematous and mild tenderness with crepitus over the right thigh (Figure 1).

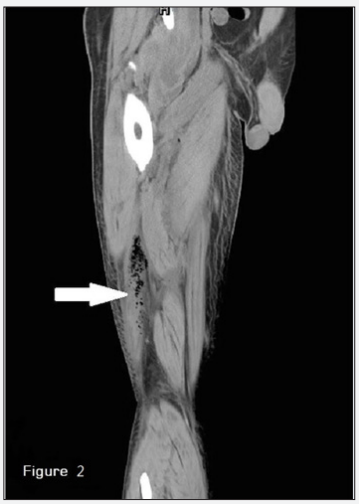

Figure 2: Swelling, erythematous and mild tenderness with crepitus over the right thigh.

Abdomen was palpated soft with tenderness over the right lower quadrant of abdomen. Laboratory data revealed white blood cell (WBC) count of 8,400/μL, band of 8%, neutrophil of 82%, hemoglobin of 12.4g/dL, platelet count of 36,000/μL, aspartate aminotransferase (AST) of 79 U/L and C-reactive protein (CRP) of 32.25mg/dL. Computed tomography (CT) of right thigh showed scattered, abnormal air accumulation

in the subcutaneous layer and muscle layer of right thigh (Figure 2). Further, abdominal contrast-enhanced CT scan showed right colon tumor with abscess formation involving right retroperitoneum and psoas muscle (Figure 3). We applied empiric antibiotic therapy with teicoplanin 200mg and meropenem 500 mg intravenously every 12 hours and fluid resuscitation. Patient received emergent laparotomy and debridement. A 5 cm x 4 cm ulcerative tumor found at cecum and perforated to retroperitoneal space.

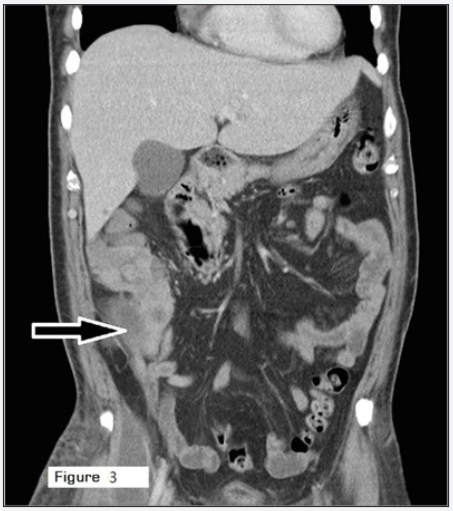

Figure 3 : Contrast-enhanced CT scan of the abdomen showed cecal tumor with abscess formation involving right retroperitoneum and psoas muscle.

Right hemicolectomy with side-to-side anastomosis, debridement and fasciotomy over right thigh were performed. Blood culture showed the presence of *Bacteroides fragilis*. Antibiotic was shifted to cefpirome 1gm every 12 hours and metronidazole 500mg every 8 hours. Abscess culture grew *Bacteroides fragilis* and *Morganella morganii*. After three weeks of admission, ventilator-associated pneumonia happened to him and sputum culture revealed *Acinetobacter baumannii* complex infection. We administrated tigecycline 50 mg every 12 hours for him. Pathological report of the specimen proved adenocarcinoma with one lymph node metastasis, classified as T4N1M0. After surgical intervention and drainage, he recovered from septic shock and was discharged 40 days later. Two months later, the followed chest computed tomography (CT) showed a 1cm nodular lesion with pleural dimpling at right middle lung.

Video-assisted thoracic surgery and wedge resection was performed and pathological report concluded a metastatic adenocarcinoma. Until now, post-operative 4month later, patient received adjuvant chemotherapy with FOLFIRI (Folinic acid, Fluorouracil, and Irinotecan). His ECOG (Eastern Cooperative Oncology Group) performance status is grade 0. Necrotizing fasciitis is a rare but life-threatening infectious disease needing early surgical and broad-spectrum antibiotic intervention. The etiology of necrotizing fasciitis in this case is unusual and rarely happened. Patient was healthy before and he had the symptoms with low grade fever, back pain and difficulty in standing for one week.

He denied of neither abdominal pain, bloody stool passage, body weight loss (BWL) nor bowel habit change. It is difficult to diagnose cecal tumor in the early stage, but devastating necrotizing fasciitis invaded rapidly to gluteal and thigh. Most of necrotizing fasciitis are associated with perforated colorectal cancer limited within peritoneum as Fournier's gangrene. In the English literatures review, there are only 13 reported cases of necrotizing fasciitis in thigh resulting from perforated colorectal malignancy (Table 1) [1-13]. Of them, mean age was 63.3±10.2 years old with male predominant (M:F = 5:1). The most common site of perforated colorectal cancer leading to necrotizing fasciitis is rectum (61.5%; 8/13), followed by sigmoid colon (23%; 3/13), descending colon (7.7%; 1/13) and cecum (7.7%, 1/13). Necrotizing fasciitis involving in right thigh (53.8%) is more commonly seen than left thigh (38.5%), and both thighs is 7.7%. The two-year survival rate is about 53.8%, and 46.2% of cases died 6 months later.

Table 1: Literature review of necrotizing fasciitis of thigh associated with colorectal malignancy.

	Authors	Year published	Patient sex	Age	Location	Colorectal cancer type	Cause	Location of necrotizing fasciitis	Bacteria culture	Outcome
1	Lam et al. [1]	1996	Male	?	Hong Kong	Sigmoid	Sigmoid bowel perforation	Left psoas abscess to upper thigh	*E. coli, Bacteroides fragilis, Edwardsiella tarda*	Died
2	Liu et al. [2]	2006	Male	56	Hong Kong	Rectum	Non-perforated rectal tumor	Both thighs	*Group G Streptococcus*	Died (7 days post-infection)
3	Highton et al. [3]	2009	Male	79	UK	Rectum	Perforated rectal cancer	Right thigh to knee	*E. coli, anaerobics*	Alive

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4	Takakura et al. [4]	2009	Male	67	Japan	Sigmoid	Sigmoid perforation with retroperitoneal abscess	Left thigh	*E. coli, anaerobics*	Alive
5	Fu et al. [5]	2009	Male	73	Singapore	Rectum	Perforated colo-anal anastomosis	Left thigh to lower limb	*Pseudomonas aeruginosa, Enterococcus*	Alive at 2 years post-infection
6	Chen et al. [6]	2010	Female	73	Taiwan	Rectum	Rectal cancer with metastatic to retro-peritoneum	Right thigh	*Klebsiella pneumonia, other anaerobes*	Died
7	Khalil et al. [7]	2010	Not stated	71	France	Rectum	Perforated rectal cancer	Right thigh	*No stated*	Died (6 years post-infection)
8	Chuang et al. [8]	2012	Male	42	Taiwan	Descending colon	Perforated descending colon cancer	Left thigh to lower limb	*E. coli, beta-Streptococcus non-ABD and anaerobes*	Alive
9	Wiberg et al. [9]	2012	Male	57	UK	Sigmoid	Perforated sigmoid colon	Left proximal thigh	*Gram positive cocci, E. coli, Pseudomonas aeruginosa*	Alive
10	Haemers et al. [10]	2013	Male	66	The Netherlands	Rectum	Perforated rectal cancer	Right buttock, thigh and lower limb	*E. coli, Group G haemolytic Streptococcus, Candida albicans*	Died (4 days post-infection)
11	Ugai et al. [11]	2014	Female	59	Japan	Rectum	Recurrent rectal cancer	Right thigh	*Haemophilus influenza type b*	Died (6 months post-infection)
12	Ng et al. [12]	2015	Male	55	UK	Cecum	Perforated cecal cancer	Right thigh	*E. coli*	Alive
13	Evans et al. [13]	2015	Male	62	UK	Rectum	Perforated rectal cancer	Right thigh	*E. coli, anaerobics*	Died (after 6 weeks post-infection)

Note: List of necrotizing fasciitis secondary to perforated colon cancer cases. The most common site is rectum (8 cases), followed by sigmoid colon (3 cases), descending colon (1 case) and cecum (1 case).

Our patient is the second case worldwide of necrotizing fasciitis in thigh resulting from perforated cecum. Interestingly, sigmoid colon cancer tends to be associated with left thigh necrotizing fasciitis (100%, 3/3). In contrast, rectum cancer easily affected to right thigh necrotizing fasciitis (75%, 6/8). The most commonly seen pathogen is Escherichia coli (75%; 8/12); followed by *Pseudomonas aeruginosa, Enterococcus, Bacteroides fragilis* and *anaerobics*. The overall mortality rate was estimated to be 25% [14]. Other risk factors including old age, diabetes mellitus, hypoalbuminemia, alcohol, site of infection, delayed surgical intervention increased mortality rate [14]. In conclusion, necrotizing fasciitis of the thigh is rarely found secondary to perforated colon cancer. Delayed diagnosis and intervention of wound increase morbidity and mortality. Emergency physicians should keep in mind of the possible unusual causes and etiologies of necrotizing fasciitis, especially in infected elderly.

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