

Necrotizing Fasciitis and Cardiac Catheterization

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Necrotizing fasciitis (NF) is an uncommon, life-threatening soft tissue infection characterized by rapidly spreading inflammation and necrosis of the skin, subcutaneous tissue, and fascia. We report a case of NF as a complication of cardiac catheterization. Familiarity with this entity may lead to earlier diagnosis and initiation of appropriate therapy.

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Cardiovascular disease remains a leading cause of morbidity and mortality in the United States. While major advances have been made in the medical therapy of coronary artery disease (CAD), cardiac catheterization plays a prominent role in both the diagnosis and treatment of CAD. Consequently, cardiac specialists perform more than one million cardiac catheterizations annually.¹

Cardiac catheterization is generally a low-risk procedure, with major complications occurring in up to 1.7% of patients and mortality in 0.11%.² Although complications such as hematoma, dissection, cholesterol emboli, renal insufficiency, contrast allergy, and pseudoaneurysm formation are well-known, serious and life-threatening infectious complications are uncommon. We report a case of necrotizing fasciitis (NF) attributable to cardiac catheterization.

Case Report

A 58-year-old man with a history of type 2 diabetes mellitus, dyslipidemia, and hypertension was referred for cardiac catheterization because of an abnormal

Table 1.

Laboratory Data

	Hospital Day 1	Hospital Day 2
Serum sodium	121 mmol/L	125 mmol/L
Blood urea nitrogen	42 mg/dL	50 mg/dL
Creatinine	1.9 mg/dL	2.2 mg/dL
White blood cell count	29.4×10 ⁹ /L	31.3×10 ⁹ /L

electrocardiogram after presenting with mild, bilateral pedal edema. An outpatient cardiac catheterization performed via the right groin showed high-grade diagonal disease, with a completely occluded obtuse marginal branch and right coronary artery. The left anterior descending artery had diffuse moderate disease throughout the course of the vessel, and the left ventricular ejection fraction was 39% (measured by planimetry).

The patient presented to his primary care physician 5 days after cardiac catheterization because of mild pain and redness in his right groin for the previous 3 days. He was afebrile and had a 12×13-cm warm, blanchable red patch in his right groin, with a tender indurated center. Results of ultrasound revealed some soft tissue edema; neither abscess nor pseudoaneurysm was detected, and cephalexin was started. He was admitted to the hospital 2 days later when no improvement was noted. On admission, results of his physical examination were unchanged, and his laboratory tests were significant for a white blood cell count of 29.4×10⁹/L

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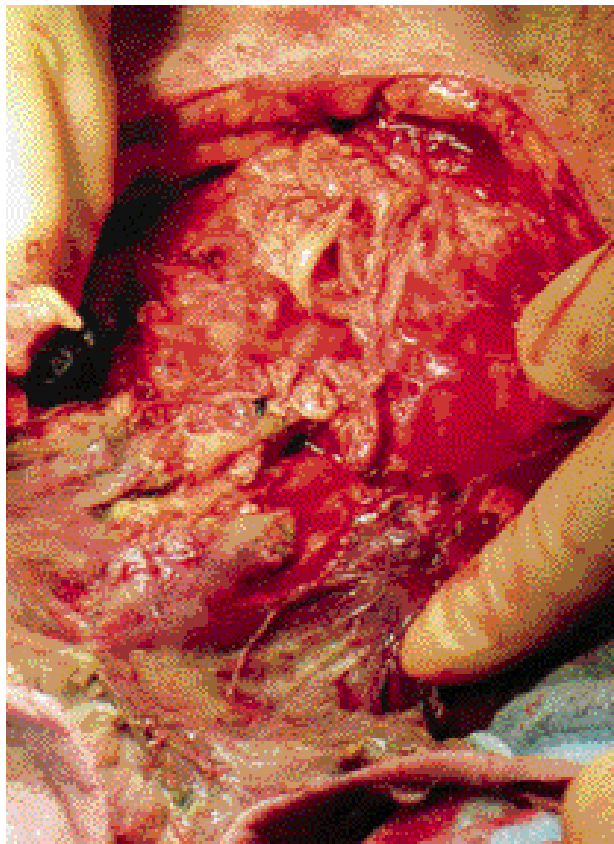


Figure 1. Intraoperative photograph of the patient's right groin, with evidence of necrotizing fasciitis.

with 85% polymorphonuclear cells, 3% bands, 7% lymphocytes, and 5% monocytes. Serum chemistries were notable for a serum sodium level of 121 mmol/L and a normal creatine kinase level; the blood urea nitrogen was 42 mg/dL, and the creatinine level was 1.9 mg/dL. The patient received intravenous clindamycin and ciprofloxacin.

On the second day of hospitalization, he was noted to have a new hemorrhagic bulla in the area of erythema, worsening renal function (Table 1), and altered mental status. Computed tomography showed enlargement of the right thigh and of soft tissues of the groin, as well as an extensive amount of gas surrounding the right femoral vessels traveling along the medial right thigh. A clinical diagnosis of NF was made and confirmed in the operating room (Figure 1). Culture of the wound grew group B streptococci, *Propionibacterium granulosa*, *Peptostreptococcus asaccharolyticus*, and the anaerobic gram-negative rods *Porphyromonas asaccharolytica* and *Prevotella bivia*. Postoperatively, the patient was treated with intravenous imipenem, ciprofloxacin, and clindamycin and was discharged to a rehabilitation facility 4 weeks later.

Table 2.

Predisposing Factors Associated With Necrotizing Fasciitis

Cardiac

Atherosclerosis
Congestive heart failure

Dermatologic

Lupus
Porphyria cutanea tarda
Psoriasis
Skin abscess
Skin burrows
Skin ulcers
Varicella

Endocrine

Diabetes mellitus

Gastrointestinal

Diverticulitis
Perforated viscous
Perirectal abscess

Immunosuppression

Acquired immunodeficiency syndrome
Hematologic malignancy
Medications

Medications

Chemotherapy
Corticosteroids
Infliximab
Long-term antibiotics
Nonsteroidal anti-inflammatory drugs
Other immunosuppressive agents
Tacrolimus

Trauma

Blunt or penetrating injury
Frostbite
Injection drug use
Insect or animal bite
Laceration
Open fractures
Surgery

Other

Advanced age
Malnutrition
Obesity

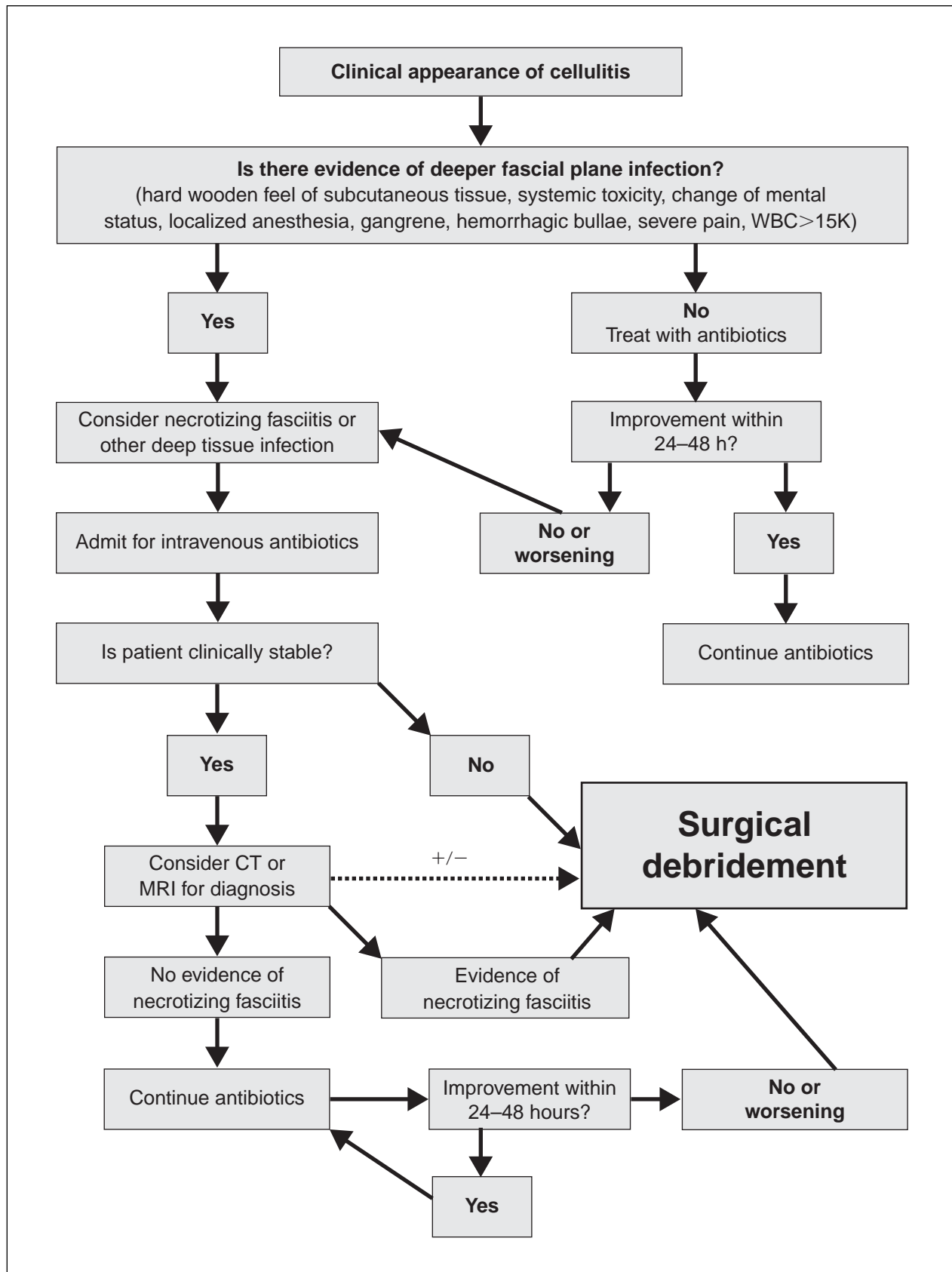


Figure 2. Algorithm for evaluation and management of suspected necrotizing fasciitis. WBC indicates white blood cell; CT, computed tomography; MRI, magnetic resonance imaging.

Comment

NF is a rare, life-threatening soft tissue infection characterized by rapidly spreading inflammation and necrosis of the skin, subcutaneous tissue, and fascia.³ Although this condition is still relatively uncommon, there has been a 5-fold increase in the incidence of NF over the last decade.⁴ Mortality rates as high as 73% have been reported,³ with higher rates in the elderly than in those younger than 50 years.⁵

Two types of NF infections have been proposed. In type 1 NF, disease is caused by a polymicrobial infection consisting of aerobic and anaerobic bacteria, such as *Clostridium* and *Bacteroides* species, which act synergistically to cause disease progression. In type 2 NF, group A streptococci, with or without coexisting *Staphylococcal* species, is responsible.³

Several risk factors for the development of NF have been identified (Table 2) and include immunosuppression, diabetes mellitus, acquired immunodeficiency syndrome, renal failure, malnutrition, and medications (eg, corticosteroids, chemotherapy, infliximab, and other immunosuppressive agents).⁶ The portal of entry for the bacteria causing NF is diverse, and any situation in which the integrity of the integument is compromised may allow entry of the bacteria and the subsequent development of NF. NF has been reported with a variety of insults, including trauma; needle sticks in intravenous drug users⁷; and surgical wounds, including laparoscopic surgery,⁸ total hip replacement,⁹ excision of melanoma,¹⁰ cosmetic blepharoplasty,¹¹ and liposuction.¹²

NF can affect any area of the body, but in adults, the extremities are most commonly involved.¹³ Early in its course, NF may be difficult to distinguish from cellulitis. Patients often complain of severe pain, which may seem out of proportion to the clinical findings. Other findings suggestive of NF include hemorrhagic bullae, frank necrosis, a localized area of anesthesia from necrosis of cutaneous nerves, and crepitation. Those affected also may exhibit high fever, chills, renal insufficiency, electrolyte disturbances, and, in fulminant cases, multiorgan system failure (Figure 2). One study found that a white blood cell count greater than $15.4 \times 10^9/L$ and a serum sodium level less than 135 mmol/L are useful parameters that may help distinguish NF from non-NF infection, particularly when classic signs of NF are absent.¹⁴

The best treatment for NF is emergent surgical debridement, broad-spectrum antibiotics, and supportive care. Repeated debridement is often

necessary. Intravenous immunoglobulins may be of benefit, though prospective studies of their use in NF are lacking.⁶

Conclusion

NF is a serious and life-threatening condition that, to our knowledge, has not been reported to occur as a consequence and complication of cardiac catheterization. Familiarity with this entity may lead to early intervention that, hopefully, may prevent significant morbidity and mortality.

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