Necrotizing Fasciitis of the Left Buttock and Pelvic Area Caused by an Infected Pimple: A Case Report

Abstract

Necrotizing Fasciitis (NF) is a rapidly progressive bacterial infection that starts in the soft tissue. The importance of early diagnosis is vital to the management and surgical removal of NF. Left undiscovered in its early stages, NF can have serious consequences. This case report features the history, findings, and follow-up of an 43-year-old Caucasian woman who came into a local hospital for a pelvis computed tomography (CT) exam, without contrast media. The radiologist diagnosed the patient as having NF. Further imaging results and findings will be discussed in this study.

Introduction

Within the deep layers of the tissue, the bacterial infection NF can arise. It is known to cause inflammation, pain, and redness of the skin. This disease resides in the muscles and in the organs of the body of the overlaying tissues that result in decaying cells. NF is an uncommon but potentially lethal infection involving the subcutaneous tissue that spreads to numerous layers of muscle across the fasciae plane.¹ This disease spreads rapidly, and the development of this illness has been known to affect people that are diabetic as well as advanced in age. NF tends to move quickly when it reaches the connective tissue, so it is imperative that the illness be diagnosed in its early stages. “Once NF reaches and proliferates in connective tissue the spread of the infection can be very fast.”² The bacterium, A beta-hemolytic streptococci are considered the cause for the disease when found in the infected tissue. Depending on the wound treatment
and what antibiotics are used will make all the difference in how the patient responds to the infection. Diagnosing this disease at the early stages of growth can determine whether the patient will ultimately survive.

NF spreads rapidly and becomes fatal due to toxin circulatory collapse. It spreads gangrene in the tissue and the deep fascia that tends to undermine the skin. Since these toxins are often deadly, it is essential that patients be given antibiotics immediately to prevent further destruction of tissue and muscle. Under normal circumstances numerous cells and tissues underlying the skin act as a barrier to help protect the body against infection. However, if the infection penetrates the barriers such as the muscle or tissue, the A beta streptococci bacteria will quickly destroy the cells. Once the cells are destroyed the tissue must be removed and replaced by healthy, uninfected, tissue taken from another part of the body.

Catching NF in its early stages enables the practitioners to effectively treat the bacterium before it becomes deadly. In order to discover NF in its early stages the radiologist must understand this disease and its symptoms so it can be quickly identified. Once the radiologist suspects NF, it’s essential that the patient be referred to a surgical team that may examine both affected and unaffected areas of the body in an operating room. The mainstays of successful management depend on early findings and instant removal of infected tissue. To remove the dead tissue, a bio-cellulose dressing, polyhexamethylene biguanide is used. This antibiotic allows for the skin and muscle tissue to fully heal. Weak antibiotics will not eliminate the severe infection that is in the patient’s body. NF is serious enough that it can develop after only a day and a half.

Most often, individuals that have immunocompromised systems are the most likely to develop NF. Statistics show that 70% of NF victims are diabetics. The unique characteristics
of the diabetes disease allows NF to spread more easily, particularly due to the fact that diabetes creates swelling in numerous areas of the body. Since swelling is necessary for NF to spread, diabetes creates a strong risk factor for this disease. The infection itself does not eat the tissue. However, the infection releases toxins. These toxins then cause destruction in the skin and muscle by triggering T-cells, which results in an overproduction of cytokines. According to Bali et al\textsuperscript{3} it is imperative that aggressive antibiotics are given to the patient as soon as possible to limit the swelling and destruction of the tissue. It is critical that these antibiotics be given intravenously to the patient to combat the infectious organisms that exist within the person’s body.\textsuperscript{3} Treatment in this manner will help the patient to recover faster from the illness.

When a patient is first diagnosed with NF the outcome depends upon how early in the process the disease was detected and treated. Each person that is treated for NF presents at different stages or grades. These grades are characterized as grade I, II, III and IV with each stage showing the illness getting progressively worse from grade I to IV. Grade I presents as redness of the skin but does not show the color of the skin turning black (see Figure 1). Grade II presents after four to seven days with the skin turning dark red to black with blisters in the affected area; this stage is painful (see Figure 2). When a patient’s condition enters grade III it presents a loss of feeling or sensation in the muscles and tissues that continue to show the black discoloration of the skin after about eight days since the infection began (see Figure 3). At grade IV the patient needs immediate surgery and aggressive antibiotics. The patient must be placed in critical care until medications are administered (see Figures 4). Appropriate medications to administer include amoxicillin/clavulanate, metronidazole, and gentamicin.\textsuperscript{4} Typically, a patient is given antibiotics before he or she is rushed to the operating room for emergency surgery to remove the area of NF and to replace it with skin grafts (see Figures 5a-d).
The prognosis of NF relies heavily on what stage or grade the infection is at and how deep the disease goes into the tissue. Unfortunately, most NF patients are not diagnosed until they are in a later stage that requires surgical or medical attention. This is because most NF patients will not realize they have a condition requiring medical attention until the disease begins to flare up and create pain. Thus, this illness has an overall mortality rate ranging from 25 to 73%. Particularly when diagnosed in later stages, it is imperative that aggressive treatment options be utilized to help the patient recover as soon as possible. Once this is completed, radiology assessments will be done to validate the success of the surgery. The following case study explores the history, diagnosis, and management of a recent case where a patient with NF was successfully diagnosed and treated.

**Case Report**

An 43-year-old Caucasian woman presented as an outpatient for a pelvic CT exam without contrast. The patient presented with severe and excessive pain along with swelling in the left buttock region. These symptoms led to having difficulty lying or sitting on her left side. While taking the patient’s history, it was learned that the affected area had originated as a pimple that spread quickly, along with redness and some discoloration. The patient’s medical history indicated a moderate sized umbilical hernia that was present with an orifice measuring 4.7 cm and a fat containing hernia sac measuring 6.4 x 4.7 cm. In a conversation with M. Cardinal, MD (September 2013), there was also a mild dextroconcave lumbar scoliosis with mild to moderate multilevel lumbar degenerative changes present. In addition, the patient suffered from diabetes. As a result, she had a weakened immune system. She was prescribed intravenous antibiotics including metronidazole and amoxicillin (clavulanate). No previous family history was provided.
for this patient. Routine x-rays of her chest, abdomen, and lumbar spine were taken with no signs of NF present. An ultrasound (US) exam was also performed showing some gas bubbles in the left buttock region.

**Computed Tomography**

The CT scanning of the abdomen and pelvis was performed with no intravenous contrast. The CT scan allowed the radiologist to more accurately determine where the general area of pain existed in the fasciae planes of the skin. The CT images revealed no fluid collections in the deep layers of the fascia. According to M. Cardinal, MD (September 2013), strands of gas extended through the subcutaneous fat of the left buttock into the left labia, left groin region, and into the left lower pannus (see Figure 6). Extensive gas in the soft tissues of the left buttock was present showing shadowing of the deep structures such as the muscle (see Figure 7). Gas bubbles were present in the left inguinal canal and left iliac fossa bordering the external iliac artery and vein along with the left common femoral artery and vein (see Figure 8). Air bubbles continued to extend into the left ischiorectal fossa to the level of the base of the bladder, including the rectum and vagina (see Figure 9). The level of the cervix also contained gas bubbles and edematous fat was present in the left buttock. The patient was diagnosed with NF of the left buttock, labia, and left lower abdominal wall and pannus. Recommended treatment included aggressive intravenous antibiotics and possible skin grafts.

**Follow-up Imaging**

The patient received aggressive antibiotics that targeted the infected area. However, it is unknown how long the patient had to take antibiotics. In addition, the patient underwent a skin
graft procedure. The skin graft was performed due to the damaged and black discoloration of the skin. The procedure was a success and there were no complications after the surgery. Her stay at the hospital lasted approximately 2 weeks. Since the disease was found early, the bacterial infection had not spread too deeply into the patient’s tissue. Therefore, the treating physicians were able to act quickly and decisively in removing the decayed tissue from the affected area. At the time the infection was diagnosed, it was determined the patient had developed a grade III case of NF. At grade III, the individual requires surgery of the affected area. In contrast, if the infection had not been diagnosed until later, the same patient may have required critical care and been at risk of death. If diagnosed later in time, the patient would have required significant surgery and long-term hospitalization. NF can spread quickly, and even once the initial infected area has been removed, additional infection can exist in other tissues or muscles within the body. Therefore, in this NF case, as with others, it was imperative that after the surgery and skin grafts, the patient continued to receive an aggressive amount of antibiotics for the next couple weeks to a month.

In more severe cases, it is common for individuals to require more than one surgery to fully recover from this disease. During this time of recovery certain medical dressings are used in the affected area to help the wound heal. During healing, some tenderness, swelling, and redness will still be present in the affected area. The wound dressings will normally need to be changed twice a week to allow for the area to continue healing properly. Skin grafting helps the healing process occur more quickly than if the wound is allowed to heal on its own through conservative wound closure.¹ Although both processes have been proven to work, it is simply a matter of which process the patient wishes to go through.
Discussion

NF is a relatively uncommon disease, in which the bacteria affect the lower portions of the body. NF does not occur in healthy individuals, rather, it typically takes place in individuals with a history of a weak immune system and this is why being able to diagnose a patient early is vital. In the early stages of NF, the signs of inflammation may not be apparent, depending on where the bacterium lies within the tissues. At this point, the infection can start to spread rapidly by moving through the numerous layers of tissue. The bacterium that runs through the body is highly toxic, producing poison in the body which causes some of the organs in the body to go into shock. Severe pain, in association with systemic toxicity, can raise the notion that NF could be present. This toxicity can result in heart failure, low blood pressure, and renal failure. Therefore; as soon as it is clear that NF may be present, aggressive antibiotics should be started. In addition, surgical removal of the affected area should occur as quickly as possible. Repeated debridement of NF in an area is sometimes necessary to control this abnormal disease.

Initially, most patients are given a penicillin (amoxicillin/clavulanate) antibiotic treatment that is used to help stave off the illness before it continues in the tissue. Once NF reaches the connective tissue in an individual, the spread of the infection is very fast. The mainstays of effective management depend on early diagnosis and immediate removal of bacteria to improve the outcome in this progressing disease. In the advanced stages of NF, removing connective tissue from the individual tends to be one of the last successful ways of treating the disease. Diagnosing this illness as soon as possible opens up options that are limited once a patient reaches stage IV. Treatment of this disease early on not only increases a patient’s life expectancy but helps to elevate some of the pain that would be generated from this illness were it to be treated at a later stage.
Prognosis

Untreated NF often results in a bleak outcome for a patient. Specifically, untreated or diagnosed in its later stages, NF can lead to limb loss, severe morbidity or death. Even with certain treatment, the death rate can be as high as 25%. Combined mortality and morbidity cases of NF have been reported as high as 70%-80%. Unfortunately, if a patient is treated at a late stage, mass tissue loss and organ damage often occurs in these areas and the medical staff is at risk for saving the patient. Extensive scarring, sepsis, and kidney failure are additional problems caused by NF. After the damaged areas are treated, it is essential that the patient be monitored closely to make sure that no advanced complications of the infection come forth.

This patient’s compromised health was a big factor in this case due to this individual having diabetes and a weak immune system. While the development of NF in the patient’s body and treatment she received to overcome is common to other NF cases, what made her outcome so positive is the fact that she was diagnosed and treated early. Since the diagnosis and treatment came early, her medical providers were able to quickly fix the problem. Thankfully, after receiving surgery to remove the affected area, skin grafting and aggressive antibiotics, she survived. According to M. Cardinal, MD (September 2013), the patient’s infection began with a regular sized pimple that became grossly infected due to her being diabetic and immune deficient.

Conclusion

An 43-year-old Caucasian woman presented as an outpatient for a pelvic CT exam after experiencing severe or excessive pain with swelling and redness in the left buttock region. The
patient had a history of diabetes with a weakened immune system. She also had a moderate sized umbilical hernia along with mild lumbar scoliosis and mild lumber degenerative changes. After the CT exam, she was diagnosed with NF of the left buttock and left inguinal area. The patient was immediately given the antibiotics metronidazole and amoxicillin/clavulanate for the affected area. She was then transported to a different hospital in the region to receive skin grafts to repair the affected area. Catching this infection at an early stage made all the difference for a positive outcome in this case. Prompt critical care, surgical removal of the bacteria, and aggressive antibiotic treatment led to a successful outcome for this individual. Had the infection been diagnosed later in time, the outcome would not have been as positive. The patient survived the infection and is doing well.
References


Figures and Captions

Figure 2. Skin blistering and turning dark red to black in affected area after four to seven days. Image courtesy of Hu A. when bacteria go bad- the case of necrotizing fasciitis. Young Investigators. 2002; 1-7.
Figure 3. Continues to portray black discoloration with a loss of feeling or sensation in the tissues after day eight. Image courtesy of Smuszkiewicz P, Trojanowska I, Tomczak H. late diagnosed necrotizing fasciitis as a cause of multiorgan dysfunction syndrome: a case report. Medical Case Reports. 2008; 1(125):1-4. doi: 10.1186/1757-1626-1-125.
Figure 5b. Debridement was repeated and the drains were removed. This image contains deep wounds of the subcutaneous tissue. Image courtesy of Alblas J, Klicks RJ, Andriessen A. A special case: treatment of a patient with necrotizing fasciitis. Tissue viability supplement. 2013; 22(15):S22-S26.
Figure 5c. Area starting to heal up after major surgery with skin starting to come together. 
Image courtesy of Alblas J, Klicks RJ, Andriessen A. A special case: treatment of a patient with 
Figure 5d. The wound being managed with a superabsorbent dressing to help the areas heal faster. Image courtesy of Alblas J, Klicks RJ, Andriessen A. A special case: treatment of a patient with necrotizing fasciitis. *Tissue viability supplement.* 2013; 22(15):S22-S26.
Figure 6. CT scan coronal image without contrast indicating strands of gas in the left medial buttck extending into the left labia and left groin area. Image courtesy of a local hospital.
Figure 7. Ultrasound (US) image showing extensive gas in the soft tissues of the left buttock. The gas or air bubbles are present in the subcutaneous fat thus causing shadowing of the deep structures such as the muscle. Image courtesy of a local hospital.
Figure 8. CT scan sagittal image showing gas bubbles through the subcutaneous fat of the left inguinal canal and left iliac fossa. Image courtesy of a local hospital.
Figure 9. Cross sectional view CT scan illustrating gas bubbles in the left buttock, left ischiorectal fossa, and base of bladder. Images courtesy of a local hospital.