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Necrotizing Fasciitis: The “flesh eating” disease

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Necrotizing fasciitis, often referred to as the “flesh-eating” disease, is a rare bacterial infection with an extremely high mortality rate with symptoms that begin subtle but can quickly ravish the human body.1-3 This life-threatening disease is relatively low, evidence of this disease can be treated back as far as the 5th century BC where it was initially described by Hippocrates.4 It was noted that the disease could persist for up to 10,000 years.2 Bob Wilson termed the disease “flesh-eating” 15 years ago. The rapid progression of this disease and the extreme morbidity and mortality it causes in a patient is extremely intriguing. This “flesh-eating” disease can present as an unseen reddened area and manifest into a serious life threatening condition with a mortality rate 94% in a matter of hours if not properly identified and treated.1 The underlying bacteria that cause necrotizing fasciitis in an individual can consume a fat up to one inch of flesh every hour.4 Necrotizing fasciitis is reported in 4.2 infections for every 100,000 people worldwide.5 The overall prevalence of necrotizing fasciitis in the United States is also relatively unknown but it is estimated that 3,000-4,000 cases are being reported each year.1 The disease has been reported higher in males versus females.6 It is noted that males are more often in adults versus children.7,8 Evidence of this disease however has increased nearly four fold in the past few decades which can most likely be related to a growing older population with increased comorbidities and predisposing risk factors, the most common of which being diabetes mellitus.6 Other risk factors predisposing an individual to necrotizing fasciitis are immune deficiencies such as AIDS, malignancies and complement C3 deficiency. Intensive drug users and individuals with dermatological concerns such as psoriasis and skin breakouts are also at increased risk.1-3

Necrotizing fasciitis can be caused by a variety of bacterial infections including Klebsiella, Stomatococcus, E. coli, Staphylococcus aureus, Aeromonas hydrophila, as well as the most commonly found cause, group A Streptococcus (GAS).1-3 While necrotizing fasciitis can develop anywhere on the body, development is most typically seen around the rectum, perianal and genital areas. Individuals predisposed to conditions and risk factors such as diabetes mellitus, chronic renal failure and advanced age put the individual at an increased risk.4 The descriptive process of necrotizing fasciitis begins once the bacteria enter the subcutaneous layer of the body. Any and all of these types of bacteria can enter through a variety of ways including a burn, laceration, insect bite, or even a minor scrape.1 The diagnosis of necrotizing fasciitis is often missed because the initial symptoms can be so subtle and is often mistaken for cellulitis.1 The initial diagnosis can also be masked because “catastrophic manifestations of the disease are often very limited.”7 Since the overall mortality of necrotizing fasciitis has been reported as high as 72%, diagnosis of this disease is almost immediate so that immediate treatment may begin.1 The symptoms such as erythema, warmth of the skin, and tenderness are often signs such as erythema, diagnosis of necrotizing fasciitis is often aided by laboratory findings such as an elevated white blood cell count.8 Necrotizing fasciitis may be present shortly after the initial injury as the bacteria can travel.1

Table 1: Predisposing factors for necrotizing fasciitis

<table>
<thead>
<tr>
<th>Disease</th>
<th>Condition</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>Chronic renal failure</td>
<td>Alcohol abuse</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Irregularly menstruating therapy</td>
<td>Cancer and pulmonary disease</td>
</tr>
<tr>
<td>Malignancy</td>
<td>Chronic respiratory therapy</td>
<td>Chronic inflammatory bowel disease</td>
</tr>
<tr>
<td>Rheumatic fever</td>
<td>Staphylococcal and streptococcal pharyngitis</td>
<td>Virus infection</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>Asthma</td>
<td>Adrenocortical tumors</td>
</tr>
<tr>
<td>Tinea</td>
<td>Churg-Strauss syndrome</td>
<td>Palliative care</td>
</tr>
<tr>
<td>Neutropenia</td>
<td>Marfan’s syndrome</td>
<td>Traumatic injury, burns and open fractures</td>
</tr>
<tr>
<td>Sarcoidosis</td>
<td>Renal failure</td>
<td>Childhood</td>
</tr>
</tbody>
</table>

Predisposing conditions and factors for necrotizing fasciitis

In conclusion, necrotizing fasciitis is a progressive and often life-threatening diagnosis that can be dated back to the “Author of Medicine,” Hippocrates. With mortality as high as 73%, a diagnosis of necrotizing fasciitis can often be identified only if it is not identified early and combated with aggressive treatment.5 Survival from necrotizing fasciitis revolves around immediate diagnosis and aggressive resuscitation as well as antibiotic therapy and surgical debridement followed by continued monitoring and ventilation by well trained healthcare providers.1

Necrotizing fasciitis located in deep fascia

References:


Postmortem view after aggressive skin debridement

Pathophysiology

Once the bacteria have found entry into the body, typically through a break in the skin such as trauma, burn or insect bite, it releases pyrogenic exotoxin A. This exotoxin causes stimulation in the production of cytokines, which leads to extensive destruction of the endothelial lining. Once the endothelial lining is damaged, fluid begins to permeate into the extracellular space resulting in profound diminished blood flow causing tissue hypoxia and ultimately leading to tissue death.4 As vasculitis and thrombi occur in the adenopathy, further serious occurs involving the subcutaneous nerves.8 The formation of thrombosis within small vessels and arteries is the primary cause of overwhelming ischemia. Thrombosis must manifest in a significant number of dermal capillaries before topical skin changes suggestive of widespread ischemia can be seen.11 The resulting skin ischemia is the primary factor for the topical signs of warmth, redness and pain often seen in these individuals. It is important to note that before these dermal signs present, a significant amount of damage is being done by the infection at the fascia layer. If this disease is not interpreted by early diagnosis and treatment, tissues that are released into the individual’s bloodstream lead to septicemia, multiple organ dysfunction syndrome and even death in as little as 24 to 96 hours after initial entry of the b

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