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Carbuncle: A challenging infective lesion

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Abstract
Carbuncle is a confluent folliculitis that is infection affecting multiple hair follicles leading to multiple sinuses discharging pus. It is commonly seen on the back of immuno-compromised patients. Admission to hospital with aggressive treatment, both systemic and locally is necessary. Optimisation of co-morbidities such as diabetes, adequate hydration, and antibiotics and are mainstay of initial treatment. Surgical intervention in the form of debridement and desloughing followed by wound care is the next line of management. Patient education at the time of discharge is necessary for prevention of recurrence.

Keywords: Carbuncle, diagnosis, management

Introduction
Carbuncle is an infection of adjacent hair follicles that extend into the surrounding skin and deeper underlying subcutaneous tissues. It typically presents as an erythematous, tender, reddened fluctuant mass with multiple draining sinuses on the surface. Regional lymphadenopathy may be present. It has predilection for the skin of the posterior neck, back, and thighs [1].

Etiopathogenesis
The legion usually starts as an infection of a single hair follicle. The causative organism is usually staphylococcus aureus followed by methicillin resistant staphylococcus aureus especially in long standing cases [1, 2]. Anaerobic bacteria may at times be present. The organism is a normal commensal of the skin usually in the groin, axilla, neck, and buttock. It is also a commensal in the anterior nares. It is transmitted by scratching, especially in individuals with poor personal hygiene. Successful invasion of tissue happens when there is a breech in the continuity of the skin. Once the organism establishes itself in the depths of the skin, it proliferates leading to infection of the hair follicles (furuncle). The infection spreads to adjacent hair follicles giving rise to a large indurated mass with multiple openings discharging pus typically described as a carbuncle. The exact incidence of carbuncle is variable. They are more commonly seen in males, especially in whom predisposing conditions such as compromised skin barrier due to eczema, diabetes, alcohol abuse, malnutrition, immuno-compromised state, obesity, and poor personal hygiene are present [2]. MRSA colonization is typically seen in individuals residing in old age nursing homes, crowded conditions, etc [3].

Clinical evaluation
Majority of patients are diabetic. The condition presents as a slowly growing tender nodule described by the patient as a pustule. The legion grows over a period of time to become larger, redder and tender. Multiple pustules develop over an area of the skin which rupture due to trivial trauma discharging pus. Patient also exhibits systemic symptoms of fever, malaise, fatigue. Regional lymphadenopathy may develop. Most common site for carbuncle is usually nape of the neck and upper back. Moist areas such as axilla and groin may also develop carbuncle [3].

Diagnosis
The appearance of a carbuncle is diagnostic. A significant area of the skin will exhibit blackening and multiple sinuses discharging pus. (Figure 1) The surrounding skin may be reddened, tender, and indurated on palpation. This can simulate other cutaneous lesions such as cystic acne, which are usually smaller in size exhibiting a solitary pustule [4].

Cellulitis may have a similar appearance, however, will not exhibit a nodular or pustular pattern. Hidradenitis suppuritiva closely simulates a carbuncle [4]. However, the main differentiating factor being the predilection for the axilla and groin in hidradenitis running a chronic course. Other rare diseases such as ORF caused by viral infection and cutaneous anthrax may at times mimic a carbuncle [5]. Untreated the legion expands involving large areas of the skin especially on the back. In a setting of immuno-compromised state, the rapidity of spread of the lesion can lead to lethal complications such as septicaemia and even rare and dangerous complications such as cavernous sinus thrombosis.

Treatment

The patient needs to be investigated after admission to hospital. A swab from the lesion should be collected and sent for smear culture and antibiotic sensitivity testing. Blood test include evaluation of blood sugars, H1bAC, and renal profile. Prompt intervention is necessary. Local treatment should commence immediately. Optimisation of comorbidities, adequate hydration, and commencement of antibiotic therapy is essential. Antibiotics include cephalosporins or dicloxicillin in majority of cases. Specific antibiotic treatment should be commenced after swab report. For MRSA positive lesions, clindamycin may be commenced. Cold compresses to the affected area with magnesium sulphate solution help in reducing tissue edema, localising the pus and prevention of spread of peripheral induration. Once glycaemic control to an acceptable level has been achieved, surgical intervention is warranted. Debridement which includes removal of the infected necrotic tissue up to the subcutaneous level is carried out until fresh bleeding is encountered from the base and edges. (Figure 2) A few more sessions of desloughing which involves removal of necrotic material is necessary to achieve complete removal of dead necrotic tissue. This should be followed by chemical desloughing with the use of EUSOL solution [4].

On a daily basis the wound needs to be irrigated with copious volume of diluted hydrogen peroxide solution followed by irrigation with normal saline. Smaller amount of slough is removed by packing the crater with a gauze soaked in EUSOL solution. EUSOL brings about chemical desloughing. The nascent chlorine liberated from EUSOL also helps in reducing bacteriaL counts. The use of ointments containing papaine and urea have also been advocated to remove smaller islands of slough. Once granulation starts growing in the ulcer crater, pro-granulating agents are used. These include medications containing placental extracts and the use of acriflavine solution if available. The aim of local treatment is to convert the lesion into a healing ulcer, which typically exhibits three zones from the centre to the periphery i.e., red zone, blue zone, and white zone. (Figure 3)

Many a times such ulcers start hyper granulating [6]. The use of 3% hypertonic saline dressings helps in preventing hyper granulations as well as decreases the discharge from the ulcer. Peripheral fibrosis is also stimulated with wound contraction thereby causing reduction in the surface area of the ulcer. (Figure 4) Since the area of the healing ulcer is large, a split thickness skin grafting is advisable to achieve quick skin cover and enhance the healing process. (Figure 5) However, one needs to be careful that a pus swab for bacterial culture should be negative before contemplating split thickness skin grafting.

Once healed, specific instructions have to be given to the patient in order to prevent further such lesions from developing.

These include

1. Meticulous personal hygiene.
2. Use of loose clothing especially in patients with hyperhidrosis.
3. Meticulous control of blood sugar in diabetic patients.
4. Optimisation of all co-morbidities predisposing to an immuno-compromised state.

Fig 1: Carbuncle showing blackened skin

Fig 2: Post debridement

Fig 3: After periodic desloughing

Fig 4: Healing ulcer

Fig 5: After split thickness skin grafting.

Conclusion

1. Carbuncle is a commonly encountered infective lesion seen especially in diabetics.
2. Rapid glycaemic control should precede surgical treatment.
3. Antibiotics should be commenced immediately accompanied with adequate hydration of patient.
4. Debridement is the main stay of surgical treatment.
5. Meticulous wound care should be administered till the lesion enters the healing phase.
6. Ancillary procedures such as split thickness skin grafting may be done in patient with extensive areas of the skin affected.
7. Proper patient education is necessary at the time of discharge to prevent recurrence.

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