



## Unusual Carbuncle on Biceps Tendon at Knee: A Case Report and Literature Review

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### Abstract

Carbuncle is a common dermatological finding occurring in hairy skin including back of neck, armpits, trunk, and groin. In this article, we reported an unusual site of carbuncle at the posterolateral aspect of knee joint overlying the distal insertion of biceps femoris. We also reviewed the previous literature regarding carbuncle management. A sixty-years-old man came to the clinic with large indurated carbuncle in the region of right knee joint overlying on the tendon of biceps femoris. It was initially misdiagnosed as a simple abscess with failed trials of evacuation through manual squeezing. Then, the case was diagnosed as a carbuncle of multinodular lesions. Surgical incision and division of the interlobular septa were performed to ensure complete evacuation and non-recurrence. The surgical procedure was done under umbrella of broad-spectrum antibiotics. The wound healed but induration remained for some days till subsided gradually. It is concluded that carbuncle might occur at knee region. It is a medical case that should be carefully diagnosed and properly managed to avoid infections' spread and complications.

**Keywords:** Skin infection; Furuncles; Knee joint; Hairy skin; Management; Biceps femoris

### Introduction

Skin carbuncle is a common dermatological lesion. It represents a localized debilitating infection made up of a cluster of furuncles. The infection begins in hair follicles and extends to skin and the underlying tissues. Therefore, it is commonly appearing in hairy skin especially in areas of thick skin such as the back of neck and trunk and less commonly in face and head. It starts firstly as a folliculitis that if untreated changes into furuncle; and forms the

carbuncle when coalesce with other contiguous furuncles occurs [1-2]. Males more affected with carbuncles than females [3]. It is commonly caused by bacterial infections with *Staphylococcus aureus* which normally inhabit the skin. The clinical manifestations include pain, tenderness, erythema, multiple sinus opening through the skin, infective gangrene and skin cellulitis. It commonly occurs in debilitating aged persons and be associated with chronic diseases such as diabetes mellitus. *Staphylococcus aureus* skin infections could cause a significant morbidity; and

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might represent a major risk for invasive diseases such as osteomyelitis, endocarditis, pneumonia and bacteremia [4]. In this article, we report a previously unreported case of unusual carbuncle in the region of knee joint. Full written consent was obtained from the patient.

## Case Report

A sixty-years-old male came to the clinic of Orthopedic Surgery at March 5, 2021; and presented with complaint of a painful swelling at the back of knee joint affecting walking and flexion of the knee joint. The swelling begins three weeks before coming to the clinic. It was appearing with sudden onset after one day of hard work. The patient was initially examined by general practitioner (GP) physician; and be diagnosed as an abscess. He was advised to do hot fomentations and to take broad spectrum antibiotics and anti-inflammatory and antipyretic drugs “diclofenac sodium”; with history of repeated manual attempts to squeeze and evacuate it. He also gave a history of taking acetyl salicylic acid 75 mg chewable tablet thrice daily. Moreover, he received ivermectin tablets for chemoprophylaxis against COVID-19. No history of vaccination was recorded. Few days later on, inflamed nodule with pustules and two or three sinus tracts draining on the surface were seen. The size was noticed to be increased; and skin became more pigmented. Then, the patient was referred to the hospital. On examination, the patient was found with mild fever (37.5 °C), tachycardia (100/min.) and anemia. His heart and other physical examinations were unremarkable. The swelling was tender, fluctuant with induration in the surrounding skin (Figure 1).



**Figure 1:** Photograph showing a carbuncle at knee region on tendon of biceps.

The skin was friable with areas of edema and necrosis with surrounding cellulitis (soft-tissue infection). Blood pressure was 130/90 mm Hg; and random blood glucose test appeared to be within normal range “130 mg/dl”. Complete blood count (CBC) showed mild anemia with red blood cells (RBCs) of 4.3 million cells/mcL and hematocrit value (PCV) of 35.5 %. White blood cells (WBCs) were within the normal ranges. However, the platelet count was low “104,000 platelets/mcL” [Table 1]. On asking, the patient gave a history of slight bleeding per gum on

brushing as well as some bleeding per rectum at defecation. The patient was hospitalized and received broad-spectrum antibiotics; cefoperazone ‘one gm’ plus sulbactam ‘500 mg’ by intravenous injection (IV)/12 hours and metronidazole ‘500 mg’ orally /8 hours). Anti-inflammatory oral drug “trypsin-chymotrypsin combination” was also added; one tablet/6 hours. Then, the patient was put in prone position; and the region of the swelling was sterilized with betadine and anesthetized locally. A single linear incision of the skin was done, followed by introducing a small artery forceps beneath skin to divide the septa between loculations of furuncles forming the carbuncle in order to open all of them in one cavity. Drainage was performed; and all necrotic tissues beneath skin were debrided. At the end of the procedure, the wound was packed with gauze soaked with iodoform solution and left in the wound for 24 hours to allow any purulent contents still remained to be drained. Then, the wound was dressed with sterile dressings, and bandaged. The dressing was removed with sterilization of wound every 12 hours. After 5 days, the antibiotics by injections were replaced by oral antibiotics “levofloxacin 500mg tablet” one/day for another 5 days with continuous change of dressings. The wound becomes dry but induration of skin remains for some days before it gradually became completely resolved (Figure 2-5).



**Figure 2:** Photograph showing a carbuncle with site of drain after its removal.



**Figure 3:** Photograph showing the site of carbuncle after ten days of surgical drainage.



Figure 4: Photograph showing the site of carbuncle after 45 days of surgical drainage.

Carbuncle is a common health problem that usually affects the skin anywhere bearing hairs [5]. Its common sites include nape of neck, back and groins. However, it might develop in other parts of body such as armpits, buttocks, chin and face [6-7]. Our case at the back of knee joint overlying posterolateral aspect of the tendon of biceps femoris might be the first case reported in such region. Its dangers, in addition to the usual risks of carbuncle, include the potential extension into the underlying knee joint. Tendon of biceps femoris is inserted into head of fibula and lateral tibial condyle. It is related medially to proximal tibiofibular joint, knee joint and lateral “fibular” collateral ligament. The common fibular nerve also runs on its medial aspect [8]. To alleviate the complications, urgent and prompt medical and surgical interferences are required.

Discussion

Location	Room No	Tel No	Reg Date	Comments	Controls
Barcode: 2103115600	Sample Type: EDTA Blood	National Id	06-03-2021 12:01	Sample Status: Received	

  

Complete Blood Picture											
Test Name	Result	Unit	From	To	Descriptive	Result2	Analyzer	Flags	Sample Status	Test Status	Printed
WBCs	4.9	x10 <sup>3</sup> /uL	4	11			xn1000		Received	Verified	<input type="checkbox"/>
Imm.Gran%	0.2	%	.16	.62		.	xn1000		Received	Verified	<input type="checkbox"/>
NEUT	3.3	x10 <sup>3</sup> /uL	2	7		.	xn1000		Received	Verified	<input type="checkbox"/>
MONO	0.4	x10 <sup>3</sup> /uL	.2	1		.	xn1000		Received	Verified	<input type="checkbox"/>
EOS	0.3	x10 <sup>3</sup> /uL	.1	.55		.	xn1000		Received	Verified	<input type="checkbox"/>
BASO	0.0	x10 <sup>3</sup> /uL	0	.1		.	xn1000		Received	Verified	<input type="checkbox"/>
LYM	1.0	x10 <sup>3</sup> /uL	1	4.8		.	xn1000		Received	Verified	<input type="checkbox"/>
NRBCs%	0.4	%				.	xn1000		Received	Verified	<input type="checkbox"/>
Granulocytes	+	x10 <sup>3</sup> /uL				.			Received	Verified	<input type="checkbox"/>
MID		x10 <sup>3</sup> /uL				.			Received	Verified	<input type="checkbox"/>
RBCs.	4.3	x10 <sup>6</sup> /uL	4.5	5.9			xn1000		Received	Verified	<input type="checkbox"/>
Hematocrit (PCV)	35.5	%	41	52			xn1000		Received	Verified	<input type="checkbox"/>
Hemoglobin (Hb)	13.4	g/dl	12.5	17.5			xn1000		Received	Verified	<input type="checkbox"/>
MCV	81.8	f	80	100			xn1000		Received	Verified	<input type="checkbox"/>
MCH	30.9	pg	27	33			xn1000		Received	Verified	<input type="checkbox"/>
MCHC	37.7		31	37			xn1000		Received	Verified	<input type="checkbox"/>
RDW	12.3	%				.	xn1000		Received	Verified	<input type="checkbox"/>
Platelet Count	104.0	x10 <sup>3</sup> /uL	150	450			xn1000		Received	Verified	<input type="checkbox"/>
PDW	10.4	%	10	20		.	xn1000		Received	Verified	<input type="checkbox"/>
MPV	9.6	f	7.1	11.2		.	xn1000		Received	Verified	<input type="checkbox"/>

Comment: Mild thrombocytopenia

Figure 5: Complete blood count showing mild thrombocytopenia.

Neglect or improper management of a case of carbuncle could lead to its spread into deep tissues especially in patients with poor hygiene and impaired immunity. In severe cases, it might lead to blood spread, toxemia and septicemia with high mortality rate [9]. It also could precipitate diabetic ketoacidosis in diabetic patients causing death [10]. A case of neglected huge carbuncle in the back of the neck extending to the posterior cranial fossa [11]. Moreover, reported a condition of bacteremia complicating a case of large posterior neck carbuncle [12]. Predisposing factors of carbuncles, in addition to diabetes mellitus, include malnutrition, anemia, obesity, eczema, alcohol abuse, poor hygiene, immunodeficiency, nephritis, heart failure, chronic colonization

with methicillin-resistant Staphylococcus aureus and hyperhidrosis. Our patient showed slight anemia. Two serious complications could occur with bacterial skin infections and carbuncles; and include cellulitis and gangrene especially in diabetic patients. Although, our patient was non-diabetic case, he presented with some cellulitis. It might be attributed to previous manipulations done to evacuate the collections. The cellulitis is a diffuse inflammation affecting the soft tissue due to spread of a substance like hyaluronidase secreted by the causative bacteria [13]. Our case was initially diagnosed as a simple abscess so trials to evacuate it were done. This worsened the situation with more extension of infection into the surrounding soft tissues and causing induration of skin. Our

patient showed mild thrombocytopenia. It might be caused by the used nonsteroidal anti-inflammatory drugs (NSAIDs) and acetyl salicylic acid. He was taking NSAIDs prescribed by the GP physician as analgesic and anti-inflammatory drug; while, the aspirin was taken as a prophylactic against thrombi in the current pandemic of COVID-19 [14-15]. These drugs could cause thrombocytopenia [16-17]. Therefore, the patient was advised to stop taking these drugs. The patient also gave a history of taking ivermectin as a prophylactic measure against COVID-19 [18]. The heart, chest and other physical investigations were free.

The most common microorganism for causing carbuncle is *Staphylococcus aureus* (about 70% of cases), followed by coagulase-negative staphylococcus and hemolytic streptococcal varieties [19]. However, other microorganisms such as *Salmonella enteritidis* might be encountered especially in diabetic patients and those with low immunity [20]. Risk factors for recurrence include improper management of previous infection and colonization with methicillin-resistant *Staphylococcus aureus*, hair removal and intramuscular injections [21]. Manipulations and shaving might cause infections through creating small breaks in the skin allowing the microorganisms that normally inhabiting it to pass into subcutaneous tissues. In our case, tight cloths in the cold weather as well as the overactivity might lead to friction at the region of knee joint that predispose to cause invisible routes for infections.

Diagnosis of carbuncles is mainly depending on the clinical manifestations, but ultrasound investigation can be a useful aid in cases of absence of fluctuation or inability to locate it [22]. The major health challenge regarding skin infections is the high recurrence rate that might reach up to 70% of cases in one year [23-25]. Such recurrence could be markedly reduced through successful management of the primary lesion by incision and proper drainage and/or antibiotics [26]. We started with urgent umbrella of broad-spectrum antibiotics covering the common causative organisms; and completed the management using the mentioned protocol. Improvement was noticed at follow-up. We don't wait for results of bacteria culture tests as they often take five days and sometimes may last several days or longer [27]. Reviewed the previous methods mentioned in the published literature to treat furuncles and carbuncles up to 2021; and found no randomized controlled trials done regarding the efficacy and safety of topical antibiotics used versus antiseptics or topical antibiotics versus systemic ones in management [28]. They added that the antibiotic sensitivity tests were not reported in management of such cases.

Caution should be taken in doing incision of carbuncle evacuation to not extend deeper than the pseudo-capsule formed by the infection in order to avoid its possible extension [29]. Surgical procedures involving a single linear incision, followed by deep blunt dissection is mandatory when carbuncle is diagnosed.

However, in lesions of face, needle aspiration might be preferred as it results in good cosmetic appearance. On the other hand, reported satisfactory results in management of carbuncles following use 5-aminolevulinic acid photodynamic therapy for three times after the usual incision and drainage. They suggested that such maneuver could lead to fast healing more than occurred with use of systemic antibiotics. Calabrese assessed the role of X-ray in treatment of carbuncles in previous studies; and concluded that X-rays in low dose could be effective in reducing pain, erythema and inflammation and enhancement of healing [30]. The mechanism of improvement could be suggested due to immune alterations enhancing phagocytosis and anti-localization influence on the pathogenic microorganisms facilitating their destruction. Moreover, investigated multicomponent toxoid vaccine (IBT-V02) in mice, and concluded that it might protect against primary infections as well as secondary lesions.

## Conclusion

Carbuncle is a serious health condition when neglected. Once it has been diagnosed, it should be surgically evacuated and drained with good umbrella of broad-spectrum antibiotics to avoid its extensions and complications.

## Funding

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## Conflicts of interest

There are no conflicts of interest.

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