



International Journal of Surgery Science

E-ISSN: 2616-3470

P-ISSN: 2616-3462

© Surgery Science

www.surgeryscience.com

2019; 3(2): 436-439

Received: 08-03-2019

Accepted: 16-04-2019

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The study of subcutaneous pressure in cellulitis of the leg and its relationship to management

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DOI: <https://doi.org/10.33545/surgery.2019.v3.i3g.966>

Abstract

Background: Investigating how subcutaneous pressure impacts the requirement for amputation in cases of leg cellulitis. Cellulitis is an infection of the skin and the tissues beneath it. Subcutaneous edoema is caused by an inflammatory reaction that causes redness, heat, and discomfort.

Methods: This observational study included 25 people who had unilateral cellulitis of the legs. Subcutaneous pressure was measured in both healthy and cellulosic limbs of voluntarily sampled volunteers. The study comprised patients with lower-extremity cellulitis of the knee who sought care at the surge or the Department of General Surgery, Dr. Patnam Mahender Reddy Institute of Medical Sciences, Chevella, Hyderabad, Telangana, India, and were admitted to the surgery wards between the years May 2018 to April 2019.

Results: Patients who had their cellulosic legs treated conservatively fared worse than those who had surgery. The study participants' signs and symptoms were identical to those previously documented in the medical literature. The symptoms were swelling, redness, heat, and pain.

Conclusion: This study adds to the evidence that people with cellulosic legs have high subcutaneous pressure. The occurrence of local complications rises in tandem with the rise in subcutaneous pressure. Individuals with excessive subcutaneous pressure were operated on the same day they were admitted to the hospital or the day after conservative therapy failed.

Keywords: Subcutaneous pressure, cellulitis legs, relationship to management

Introduction

Inflammation is the typical early symptom of cellulitis, which is a bacterial infection of the skin that occurs frequently and is frequently recognised. Information Mary Eagle is a Tissue Viability Adviser Independent, based in Farnborough, Hampshire. is a natural reaction of the body to a traumatic event, which may result in swelling, redness (erythema), discomfort, or temperature. Cellulitis-associated infection, on the other hand, has the potential to be a life-threatening condition. It is possible that only the surface of the skin will be affected, but it is also possible that the condition may become more serious, affecting not only the skin but also the subcutaneous tissues that lie beneath it, and that it will extend to the lymph nodes and the bloodstream. Although cellulitis can appear anywhere on the body, it most frequently manifests itself on the lower legs, particularly in the region close to the shins and the ankles ^[1]. It occurs equally frequently in males and females ^[2]. In a population-based investigation, it was shown that the incidence of lower limb cellulitis was relatively high, with 199 instances reported for every 100,000 person-years ^[3]. Staphylococcus aureus and Streptococcus pyogenes are the organisms that cause staph infections the most frequently ^[4]. Venous insufficiency, lymphedema, and a previous episode of cellulitis are the most common risk factors for a return of cellulitis ^[5].

Infections can emerge everywhere there is a breach in the skin's protective barrier. Co-existing diseases such as diabetes, renal failure, lymphedema, and immune system anomalies exacerbate infections. Cellulitis is usually treated with medication and rest with the affected limb elevated ^[6]. Surgical intervention is required in situations of abscesses, necrotizing soft tissue infections, and severe sepsis with multi-organ involvement. Patients with lower limb cellulitis have limited access to high-quality, peer-reviewed literature for treatment. This is a key area of healthcare concern ^[7, 8] since chronic illness frequently prevents patients from returning to work, causing financial hardship.

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There are no recommendations for the treatment of cellulitis in the lower extremities. It varies in real-world healthcare situations depending on the level of training of the accompanying physician or surgeon [9]. To measure subcutaneous pressure in patients with cellulitis of the leg. To establish a relationship between the use of subcutaneous pressure and the need for surgical intervention in cases of leg cellulitis. This study will look at the variations in subcutaneous pressure between cellulitic and healthy legs. Subcutaneous pressure should be monitored after surgical excision of cellulitis from the leg.

Materials and Methods

In this study, we give a high-level overview of the information sources and investigation strategies we used. In this study, patients with cellulitis of the lower limb, affecting one side, below the knee, who visited the outpatient surgery clinic or the general surgery department at the Dr. Patnam Mahender Reddy Institute of Medical Sciences in Chevella, Hyderabad, Telangana, India, and were admitted to the surgery wards between May 2018 and April 2019 were included.

Inclusion criteria

- Cellulitis exclusively affecting one leg
- adults older than 18 years old, unilateral

Exclusion criteria

- Bilateral cellulitis and pedal edema
- Second, necrotizing fasciitis
- A parasitic leg
- Deep vein thrombosis
- Tibia and fibula fracture
- Cellulitis patient who has already received an antibiotic course

As early as the first day of hospitalisation, the patient gave the researcher their consent after being fully apprised of the risks involved. The swelling of the cellulitic leg was measured by taking its circumference. A black skin marking was used to denote the anteromedial, lateral, medial, and lateral aspects of a body. It was calculated from the tibial tuberosity as to how far away the target was. We waited 10 seconds after needle insertion before administering the 0.5 ml of saline. It was measured and found that the pressure was stable. The subcutaneous pressure was assessed in four different spots on the cellulitic leg. Both the patient information and the BP readings were on the proforma. The surgical surgeon wasn't informed of the pressure measurement. The treating surgeon determined whether antibiotics and conservative treatment were required based on the patient's condition.

Statistical analysis: We used the t-test, Whitney U-test, and Levene's test to test the idea that independent samples have equal variance. A paired t test was used to determine the statistical significance of the difference in subcutaneous pressure between two locations on the cellulitic leg. The Mann-Whitney U test, a nonparametric variant of the sample t-test, was used to examine the significance of the pressure difference in relation to the separation from the tibial tuberosity. To rule out any variance differences between surgical and conservatively treated patients, Levene's test of equality of variance was applied. Using an independent sample t-test, we found a statistically significant difference in subcutaneous pressure between the antibiotics and surgery groups.

Results

The study's sample size was initially estimated at 25 participants. Over the course of the two years, the trial included twenty patients. The mean age of the study's patient population was 59.

Table 1: Patient age distribution in the study group

Age	20 - 30 years	30 - 40 years	40 - 50 years	50 - 60 years	60 - 70 years	70 - 90 years
Number of patients	3	3	3	6	5	5

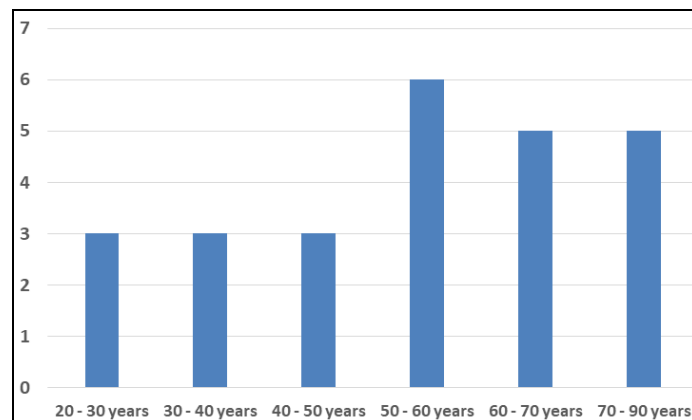


Fig 1: Patient age distribution in the study group

Figure 1 shows that the majority of the patients were over sixty, which is consistent with the results of earlier research.

Clinical presentations

The most frequently noted clinical manifestations were pain, edema, and fever. In addition to pain and edema, the study group also displayed fever (Fig. The vast majority of these people also had other health issues.

Table 2: Symptom distribution in the study group

Symptoms	Pain	Swelling	Fever
No of patients	13	6	6

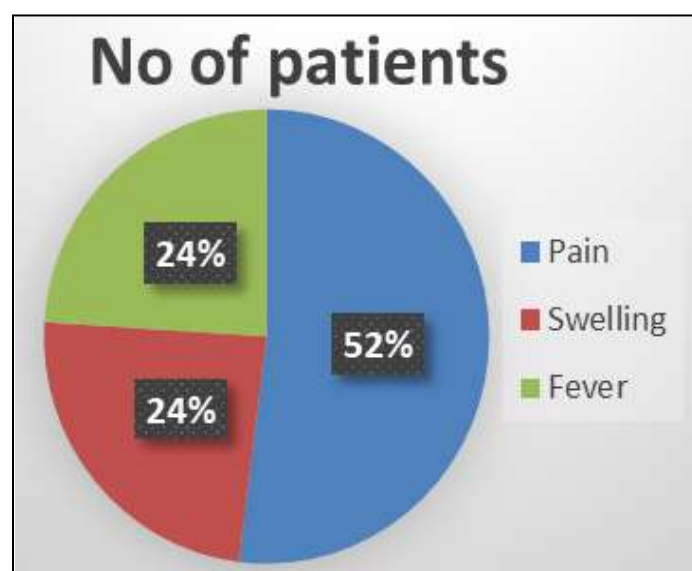


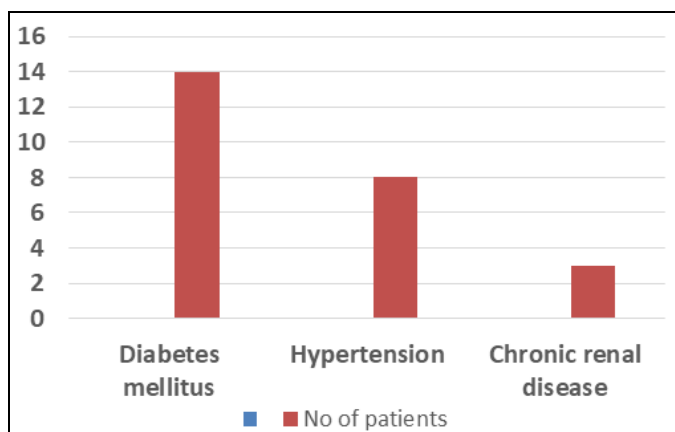
Fig 2: Symptom distribution in the study group

Figure 2 illustrates that 24% of the patients also had pain and fever in addition to the majority of them having edema.

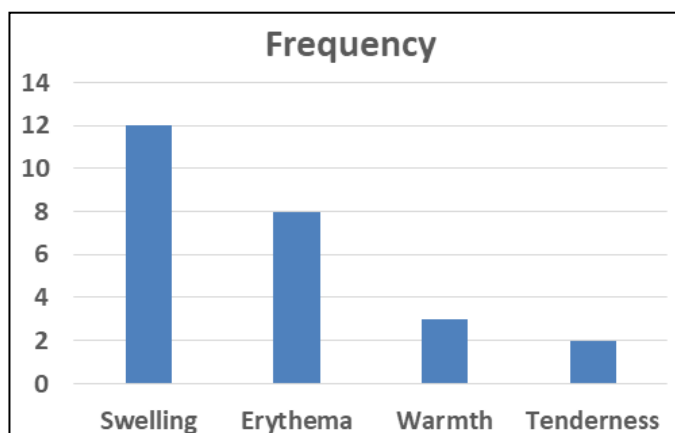
Table 3: Comorbid condition distribution in the research group

Comorbid Conditions	Diabetes mellitus	Hypertension	Chronic renal disease
No of patients	14	8	3

We found that, as previously reported in the literature, the majority of patients with cellulitis of the leg also had comorbid medical conditions. According to the graph, the majority of the study group's participants had diabetes. A portion of the research sample contained cases of diabetes mellitus.

**Fig 3:** Comorbid condition distribution in the research group**Table 4:** Documented signs at the time of admittance

Signs	Frequency	Percentage (%)
Swelling	12	48
Erythema	08	32
Warmth	03	12
Tenderness	02	8

**Fig 4:** Documented signs at the time of admittance

All of the signs and symptoms that the research group encountered were identical to those that were mentioned in the published literature. The symptoms included discomfort, heat, redness, and swelling. Even though all participants claimed to feel swollen, heated, and sensitive, Table 4 shows that only some of them had erythema. The effectiveness of the therapy was assessed using clinical indicators like symptoms and signs. The cellulitis area on the affected leg had the highest subcutaneous pressure.

Discussion

Current recommendations for the conservative treatment of cellulitis include the use of antibiotics, anti-inflammatory

medications, and techniques to reduce swelling (anti-edema). Due to the severity of the infection, surgery is usually necessary in cases of necrotizing soft tissue infection or systemic sepsis. The treating surgeon's subjective assessment is used to determine whether to perform surgery in cases of severe cellulitis with skin changes. One of the few surgical conditions for which no standard of care has been established is cellulitis of the leg.

Establishing diagnostic standards for the procedure is the main driver behind the effort to measure subcutaneous pressure and identify a relationship to surgical intervention. In this study, subcutaneous pressure in the cellulitic leg was found to be significantly higher in those who underwent surgical intervention compared to those who received conservative treatment [10]. The best treatment plan can be chosen if subcutaneous pressure is measured when the patient is admitted. Boody *et al.* compared the precision of arterial manometers, Whitesides apparatuses, and Stryker pressure monitors in the compartment syndrome diagnosis. The straight needle tends to overestimate the pressure, the study found, whereas the side port needle and slit catheter were more accurate. A Stryker device or an arterial manometer can be used to precisely measure the pressure in a compartment. As a result, we used an 18G side port needle and a Stryker intracompartmental pressure monitor to measure the pressure below the skin [11-13].

Another study by Hsiao *et al.* shows that infections with *Aeromonas* and *vibrio* species are independent predictors of mortality, whereas infections with streptococci and staphylococci were not. These predictors include the presence of malignancy, hypotension, and the occurrence of band form WBC counts greater than 10%. According to Olafsson *et al.*, necrotizing fasciitis is characterized by pain and soreness throughout the affected skin and underlying muscle. Since the pain is so intense, a ruptured muscle may be the only plausible explanation. Your perception of pain might not be accurate given the supporting scientific data [14-16].

In a separate study, McHenry *et al.* discovered that, while the average time between admission and surgery for patients who did not survive necrotizing infection of the soft tissues was about 90 hours, it was only about 25 hours for those who did. As a result of early intervention and infection cleanup, the death rate significantly decreased, according to the findings. After receiving initial conservative management for patients with elevated subcutaneous pressure, surgical intervention was ultimately necessary [17]. In this patient population, an early surgical intervention can prevent the onset of systemic sepsis, the need for significant debridement due to a growing necrotizing soft tissue infection, and the requirement for a longer hospital stay and antibiotic course.

Conclusion

This study confirms that people with cellulitic limbs have higher subcutaneous pressure than the general population. The risk of developing local problems increases as subcutaneous pressure rises. When conservative treatment failed, patients with high subcutaneous pressure were operated on the same day or the next. As a result, higher subcutaneous pressure in cellulitis of the leg correlates with surgical intervention.

Conflict of Interest: None

Funding Support: Nil

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How to Cite This Article

Rao BS, Rajeshwaraiah V. The study of subcutaneous pressure in cellulitis of the leg and its relationship to management. *International Journal of Surgery Science.* 2023;3(2):436–439.

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