**Closed versus open method in treatment of gluteal abscesses**

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**Abstract**

Abscess appears like a hard lump surrounded by inflamed tissue. If it develops under the skin close to the anus, then it is known as a ‘gluteal abscess’. The present study was a hospital-based prospective study conducted in \_alfayha teaching and almwanee teaching hospitals, Iraq between \_tenth\_january2020 to \_2nd of february2021 .Ethical approval for the study had taken from the ethical committee of basrah . After getting ethical permission and oral consent, individuals with gluteal abscess (n=100) were enrolled. They were divided into groups *viz*. gluteal abscess operated closed method (n=50) and gluteal abscess operated open method (n=50). In the close method operated surgery, about 36 (72%) were male and 14 (28%) were females. In the open method operated surgery, about 29 (58%) were male and 21 (42%) were females. About 3 (06.00%) and 45 (90.00%) patients were reported to have postoperative pain in the close and open method operated groups, respectively. Open method operated patients showed hospital stays for at least 4 days. All patients in the open method operated group showed daily visits to a surgical clinic for at least 7 days for changing the dressing and gauze from abscess cavity. All patients in the close method operated group showed visits to a surgical clinic every 4 days for assessment and normal saline washout from 2 redivac drains. Only, open method operated group showed healing by secondary intentions. About 5 (10.00%) and 20 (40.00%) patients were reported abscesses recurrent in the close and open method operated groups, respectively. About 7 (14.00%) patients showed necrotizing fasciitis complications in the open method operated group. All patients in the open method operated group were shown heavy antibiotics requirements, dangerous structures to nearby lesions and ugly scars after healing. Criteria of complicated necrotizing fasciitis were development of crepitus. The patient showed toxic tachycardia and high degree fever with severe pain in and around the abscess wound. The study can be concluded as the close method of the gluteal abscess surgery was found to be better, less painful with less than 10% recurrence rate.

**Keywords** Gluteal abscess, Open method of surgery, Close method of surgery, Antibiotics, Necrotizing fasciitis

**Introduction**

In the abscess, the pus is collected which contains dead tissue, white blood cells and bacteria (Da Costa, 1903; Seo et al., 2013; Singer and Talan, 2014; Kuhajda et al., 2015). Externally, it appears like a hard lump surrounded by inflamed tissue (Kuhajda et al., 2015). The abscess can develop anywhere on the body. However, if it develops under the skin close to the anus, then it is known as a ‘gluteal abscess’ (Puthezhath et al., 2010; Buyukoglan et al., 2011). It appears like a lump close to the anus. Signs and symptoms of abscesses include redness and inflamed tissue around the buttocks, pain, warmth, upset stomach, vomiting and diarrhoea, fever and swelling (Singer and Talan, 2014). The swelling is due to the accumulation of pus (Elston, 2009; Singer and Talan, 2014). Boils and carbuncles are kinds of abscess that often involve hair follicles, with carbuncles being larger (Marx, 2014).

Generally, abscess pus shows bacterial infection (Cox et al., 2007). Different types of bacteria are involved in a single infection (Elston, 2009). Throughout the world, methicillin-resistant *Staphylococcus aureus* bacteria were reported to be very common in these abscess infections (Singer and Talan, 2014). Patients with extremely painful abscesses may benefit from IV sedation and analgesia during drainage. To open the abscess, a single puncture using the tip of a scalpel is generally sufficient. This puncture allows the pus to drain. Then, the cavity was directly probed with a curette or gloved finger to clear loculations. Normal saline can be used for irrigation (Dhar, 2019). The recent data have not proved the effectiveness of routine irrigation or packing (O'Malley et al., 2009; Chinnock and Hendey, 2016; Dhar, 2019). Most of the previous studies were conducted upon small superficial abscesses, especially at the sites where tissue adequacy was sufficient. This tissue sufficiency facilitates the obliteration of the abscess cavity which is an essential step of this technique. None of the reports were published regarding the comparison of close and open surgery method for gluteal abscesses. With this background, we sought to evaluate the closed and open surgery methods in the treatment of gluteal abscesses on the bases of their postoperative outcome.

**Material and methods**

**Ethical permission and patient enrollment**

The present study was a hospital-based prospective study conducted in al fayha teaching and amwanee teaching hospital, Iraq between \_\_10th of january 2020\_ to 2nd of february 2021 Ethical approval for the study had taken from ethical committee of basrah . After getting ethical permission and oral consent, individuals with gluteal abscess (n=100) were enrolled. They were divided into groups, *viz*. gluteal abscess operated closed method (n=50) and gluteal abscess operated open method (n=50).

Some inclusion and exclusion criteria were considered during the study before enrollment of a patient. Exclusion criteria: The patients with a history of heart failure were excluded from the study. The patients having leukemia, steroid abuse, sickle cell anemia was also excluded. Lactating and pregnant women were not included in the present study.

**Surgery method**

**Closed method of gluteal abscess surgery:** The surgery was carried out under general anesthesia and prone positions or some time lateral positions. An adequate linear incision along the long axis of the abscess was applied. All the necrotic material and slough was drained out. Culture of pus was examined as a routine. To exclude any side pocket or necrotic material, inspection of the abscess cavity was done. In the wound, 2 redivac drains were put. The wound was closed with nylon sutures. The Gouz dressing was applied over the wound, and it was being supported by adhesive straps. After one day, the normal saline wash was given to clean the wound. This maneuver makes the patient comfort during wash and renders the abscess cavity clean better than in open method. The procedure was followed for every 4 days. The stitches were removed on the 8th to 10th postoperative day. The antibiotic and supplementary medication (anti-inflammatory drug and vitamin C) were continued till the removal of stitches. Follow-up was done after one, six and twelve months.

**Open method of gluteal abscess surgery:** The surgery was carried out under general anesthesia and in prone positions or some time lateral positions. The cruciate incision was made over the obvious part of the abscess. This procedure is also referred to as ‘incision and drainage’ method (IND or I&D). Incision and drainage was performed to release the pressure caused by the production of excess fluid. Some abscesses have more than one pocket of pus that must be ruptured to release all of the infected material. After the pus has drained, the wound is cleaned and rinsed with saline solution. An incision and drainage abscess procedure can take ten to 45 minutes. It was dependent on the size and deepness of the abscess. The wound was left open and dressing was done daily.

**Isolation and identification of the bacterial infection in the pus drained from the abscess**

The pus was collected from the abscess and diluted in the neutral saline (pH 7, 100mM). Serial dilution was done and the planting was performed on the Luria Broth (LB) media. The culture plates were incubated at 37°C for 24hr. The morphological characters were considered for bacteria identification.

**Study parameters**

At the time of anesthesia induction, all patients received broad spectrum antibiotics. It was further continued after surgery for 7 days (oral antibiotics). After surgery, postoperative pain, hospital stay, needs surgical clinic visits and healing by secondary intentions were recorded for each patient. Recurrent abscesses, necrotizing fasciitis complications, need of heavy antibiotics and occurrence of ugly scar after healing was also recorded for all patients.

**Statistical analysis**

The data were represented as the mean (percent).

**Result**

In the present study, we operated 100 individuals with gluteal abscess in two procedures, *viz*. close method (n=50) and open method (n=50). In the close method operated surgery, about 36 (72%) were male and 14 (28%) were females. In the open method operated surgery, about 29 (58%) were male and 21 (42%) were females. The data regarding gender are depicted in Table 1.

**Table 1: Gender distribution in each group**

|  |  |  |
| --- | --- | --- |
| **Groups** | **Male (%)** | **Female (%)** |
| **Close method**  | 36 (72%) | 14 (28%) |
| **Open method**  | 29 (58%) | 21 (42%) |

Around 45 (90%) and 24 (84%) patients showed less than 4cm abscess in the closed and open method operated groups, respectively. Around 05 (10.00%) and 26 (52.00%) patients showed more than 4cm abscess in the closed and open method operated groups, respectively. The site of the abscess varied in both the groups. However, both the groups showed maximum occurrence of abscess in the limb region (54% in close method and 34% in open method operated patients).

**Table 2: Abscess size and occurrence site**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters** | **Variance** | **Close method** | **Open method** |
| **Size** | <4cm | 45 (90.00%) | 24 (84.00%) |
| >4cm | 05 (10.00%) | 26 (52.00%) |

Microbiological examination reveals that the mixture of bacteria were isolated from the pus drained from the gluteal abscess. In the close methods operated patients, none of the pus samples showed presence of bacterial infection. While, open method operated patients showed presence of *S. aureus*, *S. viridans* and other bacterial species (*B. proteus, Pseudomonas, and E. coli*). Hence, patients in this group were given antibiotics, post-operatively.

**Table 3: Microbiology and postoperative antibiotic use**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters** | **Variance** | **Close method** | **Open method** |
| **Microbiological examination** | *S. aureus* | 00.00 | 33% |
| *S. viridans* | 00.00 | 15% |
| Other bacterial species (*B. proteus*, *Pseudomonas*, and *E. coli*) | 00.00 | 45% |
| Not known | 05% | 07% |
| **Post-operative antibiotic use** | -- | 00.00% | 100% |

Data regarding post-operative pain, hospital stays, need for a surgical clinic visit and healing by secondary intentions is depicted in Table 4. About 3 (06.00%) and 45 (90.00%) patients were reported to have postoperative pain in the close and open method operated groups, respectively. Open method operated patients showed hospital stays for at least 4 days. All patients in the open method operated group showed daily visits to a surgical clinic for at least 7 days for changing the dressing and gauze from the abscess cavity. All patients in the close method operated group showed visits to a surgical clinic every 4 days for assessment and normal saline washout from 2 redivac drains. Only, open method operated group showed healing by secondary intentions.

**Table 4: Assessment of post-operative parameters in both the groups**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters** | **Variables** | **Close method** | **Open method** |
| **Post-operative pain** | Yes | 3 (06.00%) | 45 (90.00%) |
| No | 47 (94.00%) | 5 (10.00%) |
| **Hospital stays** | At least 4 days | -- | 100 (100%) |
| No | 100 (100%) | -- |
| **Need surgical clinic visit** | Daily for at least 7 days | -- | 100 (100%) |
| Every 4 days | 100 (100%) | -- |
| No | -- | -- |
| **Healing by secondary intentions** | Yes | -- | 100 (100%) |
| No | 100 (100%) | -- |

The data regarding abscesses recurrent, necrotizing fasciitis complications, the need for heavy antibiotics, dangerous structures to nearby lesions and ugly scar after healing are depicted in the Table 5. About 5 (10.00%) and 20 (40.00%) patients were reported abscesses recurrent in the close and open method operated groups, respectively. About 7 (14.00%) patients showed necrotizing fasciitis complications in the open method operated group. All patients in the open method operated group were shown heavy antibiotics requirements, dangerous structures to nearby lesions and ugly scars after healing. Criteria of complicated necrotizing fasciitis were development of crepitus. The patient showed toxic tachycardia and high degree fever with severe pain in and around the abscess wound.

**Table 5:** **Assessment of secondary complications and abscesses recurrent in both the groups**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters** | **Variables** | **Close method** | **Open method** |
| **Recurrent abscesses** | Yes | 5 (10.00%) | 20 (40.00%) |
| No | 45 (90.00%) | 30 (60.00%) |
| **Complicated to necrotizing fasciitis** | Yes | -- | 7 (14.00%) |
| No | 50 (100.00%) | 43 (86.00%) |
| **Need heavy antibiotics** | Yes | -- | 50 (100.00%) |
| No | 50 (100.00%) | -- |
| **Dangerous method for nearby structures** | Yes | -- | 50 (100.00%) |
| No | 50 (100.00%) | -- |
| **Ugly scar after healing** | Yes | -- | 50 (100.00%) |
| No | 50 (100.00%) | -- |

**Discussion**

In the present study, we operated 100 individuals with gluteal abscess in two procedures *viz*. close method (n=50) and open method (n=50). After surgery, postoperative pain, hospital stay, needs surgical clinic visits and healing by secondary intentions were recorded for each patient. Recurrent abscesses, necrotizing fasciitis complications, need of heavy antibiotics and occurrence of ugly scar after healing was also recorded for all patients.

A study from Iraq revealed 60% of gluteal abscesses following intramuscular injections were associated with co-morbidities like diabetes mellitus, anemia, jaundice, malignancy, and chronic steroid (Abdulla et al., 2012). Nixon and Akoh (2014) did retrospective case review on the 117 patients for their efficiency of the superficial abscesses management. The mean age of the enrolled patients were 38 years and operative time recorded as less than 30 minute. In our study, we required around 10 to 45 minutes for incision and drainage abscess procedure. It was reported that about 11% patients required further antibiotic treatment and dressing care in the hospital. A number of patients required hospital stay for 3-4 days (Nixon and Akoh, 2014). Khanna et al., (1984) reported use of antibiotics prior to 48 hours of surgery was found to be beneficial. Our results are in accordance with these reports. In our study, we report that in the open method of surgery, all patients are required to stay at hospital for at least 4 days. In this group, all patients need to visit a surgical clinic for at least 7 days after hospital discharge. Oral antibiotics were further continued for 7 day after surgery. About 3 (06.00%) and 45 (90.00%) patients were reported to have postoperative pain in the close and open method operated groups, respectively.

The closure technique depends upon mostly four aspects i.e. abscess localization, infection elimination, curettage of the abscess cavity wall and complete obliteration of the abscess cavity space. The abscess localization cavity was ensured by pre-operative application of an antibiotic around 48hr. This leads to the sterilization of the abscess peripheral area as well as further abscess get stopped. This procedure surly localises the abscess. The infected abscess was also converted into a sterile pus collection. An adequate incision along the long axis of the abscess cavity will help to drain all the abscess and permit a thorough inspection of the interior of the abscess cavity. No side abscess pocket or slough in the cavity should however remain, otherwise failure is inevitable. Curettage of the wall of the abscess cavity is done to break the so called barrier of penetration of the antibiotic. Complete obliteration of the abscess cavity is very important. Any residual space will invite the collection of serum or blood which is bound to get infected, and will lead to failure of the procedure. The complete obliteration of the abscess cavity will also help to approximate the epithelial surfaces and granulation tissues thus inviting tissue healing by primary intention. In the current study, antibiotics are continued till the removal of stitches. This is useful in the residual infection eradication. All these factors are very essential for the success of primary closure technique and fortunately are under the control of the dealing surgeon.

Puthezhath et al., (2010) used repeated aspirations method to clean to abscission. In the present study, we have used normal saline washout from 2 redivac drains. Kumar and Chandra, (2003) reported a gluteal abscess case study in a child having tuberculosis of the sacrum with cauda equina compression. In this patients cold abscess spread along the aorta branches to reach the gluteal region (Kumar and Chandra, 2003). However, in our study we have not focused on the route of gluteal abscess. Instead, we effectively showed that the closed method of the gluteal abscess surgery method was found to be better for the recovery.

**Conclusion**

Open method operated patients showed hospital stays for at least 4 days. All patients in the open method operated group showed daily visits to a surgical clinic for at least 7 days for changing the dressing and gauze from abscess cavity. All patients in the close method operated group showed visits to a surgical clinic every 4 days for assessment and normal saline washout from 2 redivac drains. In the close method of surgery, less postoperative pain, minimum rate of abscess recurrence and required low dose of antibiotics as compared to the open method of gluteal abscess surgery.

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