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Removal of the wound drain at the right time after total joint arthroplasty

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Abstract
Introduction: The principle of wound treatment after joint arthroplasty, closed suction drainage, is well established. The effectiveness of this method has recently come under scrutiny. The use of closed suction drains is currently regarded as debatable.
There isn't much information available to help the surgeon determine how long the drain should stay in place. Typically, this has only ever included directions.
This has typically just included directives like "remove drains once drainage has ceased or becomes negligible," which can take anywhere between 24 and 72 hours following surgery
Results: Average wound drainage shrank during time. When compared to TKAs, THAs have comparable quantities. The first 24 hours for both groups saw the largest drainage.
Thus, effective antibiotic prophylaxis gradually declines with time; this observation supports the notion of early drain removal. In conclusion, this study supports the use of drains to reduce hematoma formation and avoid infection and perioperative wound morbidity while simultaneously highlighting the significant infection risk associated with the drains themselves.
Conclusion: Average wound drainage shrank during time. When compared to TKAs, THAs have comparable quantities. The first 24 hours saw the highest drainage for both groups (56% for the hips and 64% for the knees).
The percentage of infected drains increased noticeably after 48 hours.

Keywords: Drain removal, arthroplasty, wound treatment

Introduction
The principle of wound treatment after joint arthroplasty, closed suction drainage, is well established. The effectiveness of this method has recently come under scrutiny. The use of closed suction drains is currently regarded as debatable.
Future quantitative research by Magnussen [1, 2] and colleagues "The formation of hematoma and perioperative wound complications were found to be significantly correlated when employing ultrasonography to detect wound hematoma. Based on this assumption and prior research showing that drains will decrease hematoma formation, "but raise the risk of infection,' we believe drains should be utilized if removed as soon as possible after surgery.
There isn't much information available to help the surgeon determine how long the drain should stay in place. Typically, this has only ever included directions.
This has typically just included directives like "remove drains once drainage has ceased or becomes negligible," which can take anywhere between 24 and 72 hours following surgery.
After 24 hours, Millett *et al*. [3] research demonstrated that the effect of minimizing hematoma formation is lost, and they hypothesized that skin microbes will enter the wound through the drain. This research aims to support those results.

Materials & Methods
A total hip or total knee arthroplasty patient was chosen for a dual-center prospective clinical research. The orthopaedic surgeons from Sri Aurobindo Institute of Medical Science carried out the operation. Laminar air flow was used for the operating rooms where surgeries were performed. The duration of time the drains remained in place following surgery was assigned at random by the surgeons.

All patients received the same level of postoperative treatment. Gentamicin (80 mg administered intravenously twice or three times a day) and flucloxacillin were the preventive antibiotics utilized (1 g four times a day intravenously). The medications were given before the procedure and continued for 48 hours thereafter. In the majority of instances, spinal anaesthetic, antiembolism stockings, subcutaneous heparin, and deep vein thrombosis prevention were employed. The study excluded any patients having a disease or medication regimen that would affect bleeding.

For a total of 70 patients, the study included 30 males and 30 women. The average age was 65. (Range, 26-86 years). Three total hip arthroplasty (THA) revisions were performed on 45 patients, and 25 patients underwent total knee arthroplasty (TIMs). 51 procedures were carried out. Osteoarthritis, rheumatoid arthritis, loose parts, and avascular necrosis were the main etiologies. Each case had one or two deep drains, for a total of 70 drains.

Each of the 60 mL reservoirs had a drain that was 1.9 mm in external diameter and applied 100 mmHg suction pressure as the reservoir filled. In order to swap reservoirs, the drains were clamped. Drains were categorized according to how long they remained in place after being removed and some were kept there at random for up to 96 hours. Each 24-hour period up to removal, drainage was measured.

A bacteriology swab was collected from the location where the drain punctured the skin after the drain was removed. For microscopy and culture, this was delivered together with the drain tip. Every revision joint was routinely swabbed during surgery; any positive results were disregarded from the investigation. The average blood loss and total number of drain tips for each 24-hour period.

The initial step in specimen collection was a bacteriology swab at the drain site. The site was then cleaned with an iodine solution. Drains were then removed using an aseptic technique

Observation and Results

Average wound drainage shrank during time. When compared to TKAs, THAs have comparable quantities. The first 24 hours for both groups saw the largest drainage.

At least one specimen from 29 patients had a bacterium present when it was cultured. In four individuals, just the drain site yielded positive cultures, and in six patients, the drain tip and the corresponding site yielded similar organisms when cultured. In four of these cases, two deep drains from the same patient tested positive, although positive cultures came only from the drain tip. This resulted in a collection of 23 drain recommendations. Microorganisms were found in 6 of them from both the agar plate and the nutrient broth, while they were found in the remaining 17 drain tips exclusively from the nutrient broth.

Discussion

These data corroborate earlier findings that within the first 24 hours following surgery, the majority of wound leakage will take place. In this study, by that point, around 70% of the mean total drainage had taken place.

Work by Waugh and others demonstrated that prolonged suction encourages bleeding and that the majority of active bleeding often stops after 12 hours. Willett [4] and others 91% of the mean drainage, according to their THA study, had already happened 24 hours after surgery. On a purely quantitative basis, we also consider drain clearance after 24 hours to be fair.

On the basis of culture results, removal as early as 24 hours is also of paramount relevance. The frequency of contaminated drain tips has significantly increased over the past 24 hours for both THA and TIN, even if the difference is not statistically significant (.1 P .25). As seen in Figures 1 and 2, a decrease in mean wound drainage thus sharply contrasts with an increase in drain-tip contamination at 24 hours. On similar grounds, studies by Waugh and Stinclifield[5] and Willett *et al* [3] suggested early drain removal.

Drains are supposed to lessen the likelihood of deep infection and the development of a haematoma, despite the fact that there is no proven scientific evidence to support their usage in total knee arthroplasty. Because we were unable to demonstrate a statistically significant benefit from the use of a single deep drain in cemented knee arthroplasty, our study implies that these views are wrong. Using a drain could potentially be harmful. According to Holt *et al* findings [6], individuals without drains experienced more dressing changes and ecchymosis in certain locations.

Even though there was noticeably greater bleeding into the dressings in the absence of a drain, this did not result in additional pain or the requirement for dressing changes. Nursing is made more difficult and mobilization is hampered by the presence of a drain. When implanting un-cemented components, drainage may be advantageous because the perioperative blood loss could be higher. Since we conducted our study, reinfusion drainage systems are now readily accessible. The possibility of reinfusion may lessen the requirement for transfusion while making up for the increased blood loss in patients with drains.

The potential for specimen contamination during collection and transit is acknowledged. Although it is slightly higher than the 5.8% observed by Willet *et al*., [4] our collection of 164 deep drains revealed a 17.7% contamination of drain tips, which compares favourably to Waugh and Stinchfield's [5] 17%. Since Staphylococcus epidermidis is presently acknowledged as the most common pathogen in infections of prosthetic joints, the high percentage of this bacteria does not surprise us. Earlier research by Cruse [7] and Foord [5] and Simchen *et al*. [8] does not yet explicitly link wound drain contamination with early or late wound infection.

We think routine culture of the drain tip would be a worthwhile technique if a drain is removed more than 24 hours after surgery to check for the presence of possible infections.

Antibiotics for prevention should be taken while drains are in place. Nelson *et al*. [9] investigated the amount of antibiotics present in wound contents and found that, despite constant IV dosing levels, they gradually declined over time. This drop is strongly influenced by the initial clot levels, which, if they are inadequate, cause a sharp decline in the minimum inhibitory concentration in wound contents. Thus, effective antibiotic prophylaxis gradually declines with time; this observation supports the notion of early drain removal. In conclusion, this study supports the use of drains to reduce hematoma formation and avoid infection and perioperative wound morbidity while simultaneously highlighting the significant infection risk associated with the drains themselves.

The removal of the drains when the risk of wound infection outweighs the benefit of hematoma prevention is the solution to this contradiction.

The results of this study indicate that drains should typically be taken out 24 hours after a joint arthroplasty.

Conclusion

Average wound drainage shrank during time. When compared to TKAs, THAs have comparable quantities. The first 24 hours saw the highest drainage for both groups (56% for the hips and 64% for the knees). At least one specimen from 28 patients had a bacterium present when it was cultured. In four individuals, just the drain site yielded positive cultures, and in six patients, the drain tip and the matching site yielded the same organisms in cultures. Only the drain tip produced positive cultures in 19 patients; in four of these cases, the same patient had two deep drains that were also positive. This resulted in a collection of 23 drain recommendations. Microorganisms were found in 6 of them from both the agar plate and the nutrient broth, while they were found in the remaining 17 drain tips exclusively from the nutrient broth. A drain tip that had been removed during the first 24 hours of surgery provided one of the positive cultures. All of the remaining positive cultures were from samples collected after then. The percentage of infected drains increased noticeably after 48 hours.

Conflict of Interest

Not available

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Not available

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