International Journal of Research in Medical Sciences
Aski B et al. Int J Res Med Sci. 2015 Feb;3(2):409-411
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: 10.5455/2320-6012.ijrms20150205

Research Article

Drain tip culture following total knee arthroplasty

Bahubali Aski[1]*, Narendra Vaidya[2], Rakesh Patil[2], Nelson Pinto[1]

[1]Department of Orthopaedics, Srinivas Institute of Medical Sciences and Research Centre, Mukka, Surathkal, Mangalore, Karnataka, India
[2]Department of Orthopaedics, Lokmanaya Hospital, Nigdi, Pune, Maharashtra, India

Received: 22 December 2014
Accepted: 12 January 2015

***Correspondence:**
Dr. Bahubali Aski,
E-mail: orthoaski@gmail.com, orthoaski@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Placing a suction drain following total knee replacement is usual practice which is been followed by many surgeons. Closed suction drainage following arthroplasty is a routine with the aim of preventing wound hematoma and thereby reducing the risk of infection. Surgical site infections (SSI) in orthopaedic surgeries are disastrous and often lead to significant morbidity and mortality. Usefulness of drain tip culture in predicting the wound infection is been tested but results are controversial.
Methods: It is a prospective study of 546 drains (352 patients) who underwent unilateral or bilateral Total Knee Arthroplasty (TKA). The drain tip was sent for culture at the time of removal. Cultures from the SSI were also collected. Cases that had at least six months of follow up were included in the study.
Results: Drain tip culture was positive in total of 18 patients. Three patients had developed deep infection and 10 patients had superficial infection. All three patients with deep infection and 9 out of 10 patients of superficial infection were drain tip culture positive. Out of 9 culture positive superficial infections, one had different bacteria identified from the wound site. Drain tip culture was positive in 3.39% of drains and infection (wound culture) was positive in 2.26% of wounds. On statistical analysis we found drain tip culture has sensitivity of 91.66%, specificity of 98.64%, positive predictive value of 61.11% and negative predictive value of 99.8%.
Conclusion: Drain tip culture positivity helps in predicting the future chance of developing the infection. If drain tip culture is negative, then there is almost near nil chances of infection.

Keywords: Drain tip culture, Surgical site infection, Closed suction drain

INTRODUCTION

The term surgical site infection (surgical site infection) includes all postoperative infections occurring at surgical site. Inspite of advances in infection control, SSI remains a major limiter of surgical horizons.[1] A surgical wound may get infected by the exogenous bacterial flora which may be present in the environmental air of an operation theatre or by the endogenous flora.[2] The infection rate following total joint replacements has declined to below 1%.[3] SSI in orthopaedic surgeries are disastrous and often lead to significant morbidity and mortality.[4] Like in our institution closed suction drainage after joint arthroplasty is common practice in many institutions.[5] Aim of our study is to find out usefulness of routine drain tip culture in predicting postoperative infection in our setup.

METHODS

It is a prospective study of 546 drains (352 patients) who underwent unilateral or bilateral TKA between June 2013 and January 2014. Single drain tube was used in all the

unilateral cases (Figure 1), two separate drains were used in bilateral cases and connected to separate suction apparatus (Figure 2). Study end point was end of July 2014 that is at least six months from index surgery, where all the data was collected. We were left with 530 drains (338 patients) with culture report at final follow up of six months. Records regarding wound healing, superficial/deep infection and discharge from wound with culture from wound site were analysed.

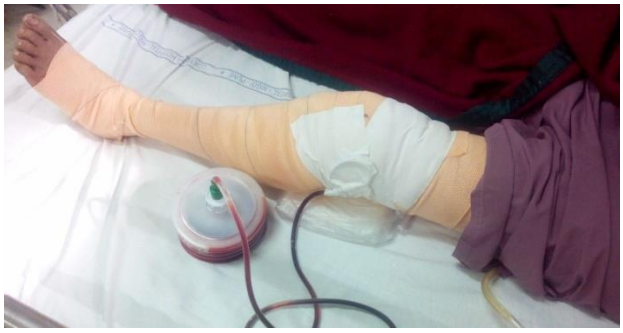

Figure 1: Closed suction drain in situ (Single drain tube in unilateral TKA cases).

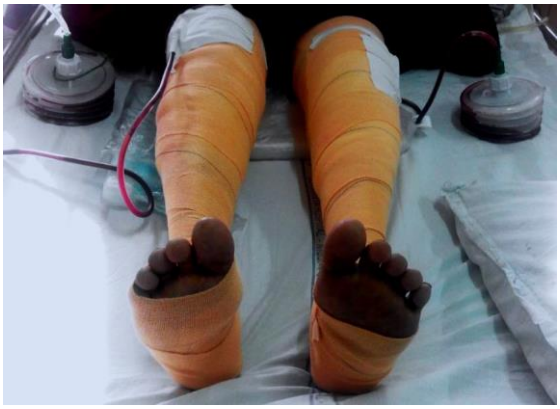

Figure 2: Closed suction drain (Two separate drains were used in bilateral TKA case and connected to separate suction apparatus).

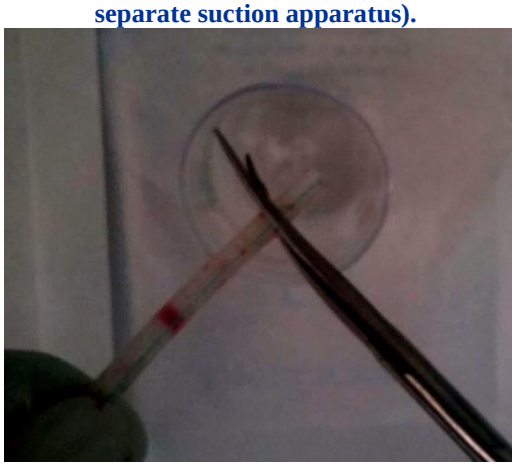

Figure 3: Aseptic precautions taken while collecting and sending drain tip for culture.

Procedure

Routinely we used to place drain for 24 hours and 48 hours if discharge is more than 50ml but never beyond 48 hours. The surrounding skin used to be disinfected with povidine iodine prior to drain removal. With aseptic precautions approximately 1cm of terminal end of drain tip was cut (Figure 3) after taking out from the joint and sent for culture. Antibiotic prophylaxis with 1 gm ceftriaxone was given to all the patients starting just before anaeshesia to 3 days post-operative period. Culture reports of SSI were also collected.

Statistical analysis

The collected data was analyzed to get sensitivity, specificity, positive predictive value and negative predictive value of drain tip culture.

RESULTS

Out of 352, fourteen patients lost the follow up and 338 patients (530 drains) were included for final analysis. Drain tip culture was positive in total of 18 patients. Three patients had developed deep infection and 10 patients had superficial infection. All three patients with deep infection and 9 out of 10 patients of superficial infection were drain tip culture positive. However in one patient with superficial infection, the drain tip culture was negative. There was correlation between the drain tip culture positivity and isolated bacteria from the wound site in all except one, where different flora was identified. Bacteria identified from the SSI are Staphylococcus aureus (6), Coagulase negative Staphylococcus (3), Pseudomonas (2) and Streptococcus (1). Drain tip culture was positive in 3.39% of drains and infection (wound culture) was positive in 2.26% of wounds. On statistical analysis we found drain tip culture has sensitivity of 91.66%, specificity of 98.64%, positive predictive value of 61.11% and negative predictive value of 99.8%.

DISCUSSION

Closed suction drainage has become an established routine with the aim of preventing wound hematoma and thereby reducing the risk of infection.[5] The use of closed suction drainage reduces the retrograde migration of bacteria along the drain tract and, therefore, reduces the frequency of infection, compared with the use of simple conduit drains.[6] Suction drain tips, which are in close contact with the bone and implants are considered to be the ideal “swab” for detection of microbes in the wound during early postoperative period.[7]

Sorensen and Sorensen removed the drains when the yield was less than 20 mL per day. The frequency of positive drain tip cultures increased if the drainage time exceeded 6 days. This could be explained by an increased risk of retrograde migration of bacteria from the skin, advocating early removal of the drains. However, also

with this explanation, early removal of the drains seems recommendable, as they may harm the host-defense reaction.[3] Routinely we kept drain for 24 hours, 48hours only if discharge is more than 50ml. Willet et al. found a risk of ingress of skin microorganisms into the wound, and concluded that the suction drain should be removed at the earliest time, and certainly before 24 h following THA.[8] Willemen et al. found increased wound infection that parallels the duration of drainage.[9]

In a prospective study by Overgaard et al., of 81 primary total hip arthroplasties in 78 patients, 68 drains were removed within 48 hour with no risk of developing wound complications and the reason for which could be the short drain period, and prophylactic antibiotics administration until the drain track becomes dry.[10] All the drains were removed by 48hrs in our study. Bernard's study of 843 patients confirms that closed suction drainage is clearly not the source of infection, because he found no correlation between isolation of bacteria from drainage fluid and the development of postoperative sepsis.[6] Drain tip culture was positive in 3.39% of drains and wound culture in 2.26% of surgical wounds. The different culture positive rate in different studies may be due to routine administration of intravenous antibiotic prophylaxis for three post-operative days and the technique of drain removal and culture might have been the cause for variation.[11] Sankar states wound infection was significantly related to positive suction tip culture but not to positive drain fluid culture.[7] In our series drain tip was cultured, not the suction fluid.

The positive drain tip culture predicts wound infection in 50% and a negative culture virtually excludes the possibility of a deep infection.[7] In our study prediction of infection with drain tip culture found to be 61.11% (positive predictive value) and ability of the drain tip culture to exclude infection to be 99.8% (negative predictive value). Bernard concludes that, for aseptic orthopedic surgery, SDC (suction drain culture) is not useful in detecting postoperative infection. However, for septic orthopedic surgery, it is of clinical importance.[6] We found drain tip culture helps in predicting the future chance infection and also to exclude in case of aseptic procedures, but we don't have experience of the same with septic procedures.

CONCLUSION

Drain tip culture positivity helps in predicting the future chance of developing the infection. The same alerts the surgeon to take necessary step at the earliest. Drain tip culture if negative there is almost near nil chances of infection.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Dellinger EP. Surgical infections and choice of antibiotics. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, eds. Sabiston Textbook of Surgery. 16th ed. Philadelphia, Pennsylvania: Saunders; 2002: 171-172.
2. Culbertson WR, Altemeier WA, Gonzalez LL, Hill EO. Studies on the epidemiology of post-operative infection of clean operative wounds. Ann Surg. 1961;154:599-603.
3. Sorensen AI, Sorensen TS. Bacterial growth on suction drain tips. Prospective study of 489 clean orthopaedic operations. Acta Orthop Scand. 1991;62:451-4.
4. Ikeanyi UOE, Chukwuka CN, Chukwuanukwu TOG. Risk factors for surgical site infections following clean orthopaedic operations. Niger J Clin Pract. 2013 Dec;16(4):443-7.
5. Weinrauch P. Diagnostic value of routine drain tip culture in primary joint arthroplasty. Aust NZ J Surg. 2005;75:887-8.
6. Bernard L, Pron B, Vuagnat A, Gleizes V, Signoret F, Denormandie P, et al. The value of suction drainage fluid culture during aseptic and septic orthopedic surgery: a prospective study of 901 patients. Clin Infect Dis. 2002;34:46-9.
7. Sankar B, Ray P, Rai J. Suction drain tip culture in orthopaedic surgery: a prospective study of 214 clean operations. Int Orthop. 2004 Oct;28(5):311-4.
8. Willet KM, Simmons CD, Bentley G. The effect of suction drains after total hip replacement. J Bone Joint Surg (Br). 1988;70:607-10.
9. Willemen D, Paul J, White SH, Crook DW. Closed suction drainage following knee arthroplasty: Effectiveness and risks. Clin Orthop. 1991;264:232-4.
10. Overgaard S, Thomsen NO, Kulinski B, Mossing NB. Closed suction drainage after hip arthroplasty. Prospective study of bacterial contamination in 81 cases. Acta Orthop Scand. 1993 Aug;64(4):417-20.
11. Murphy JP, Scott JE. The effectiveness of suction drainage in total hip arthroplasty. J R Soc Med. 1993 Jul;86(7):388-9.

DOI: 10.5455/2320-6012.ijrms20150205
Cite this article as: Aski B, Vaidya N, Patil R, Pinto N. Drain tip culture following total knee arthroplasty. Int J Res Med Sci 2015;3:409-11.