

Frequency of Infection in Cervical Lymph Node Biopsy Site using Chlorhexidine and Povidine Iodine

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Abstract:

Background: Lymph node are located throughout the lymphatic system, they are concentrated in certain areas of the body including head and neck. Cervical lymph nodes are lymph nodes found in the neck. Of the 800 lymph nodes in the human body, 300 are in the neck. Cervical lymph nodes are subject to several different pathological conditions including tumours, infection and inflammation.

Methodology: The Povidine-iodine and chlorhexidine for preoperative skin preparation in cervical lymph node biopsy procedure were used in this study and patients were asked for follow up after a week. On follow up day their wounds were checked, assessed and withdraw all stiches and complications were recorded accordingly and analysed them. It was discussed and showed that which one of Povidine-iodine and chlorhexidine is best to use for preoperative skin preparation in cervical lymph node biopsy procedures to reduce surgical site infection and economical one.

Results: Out of 150 patients, 46% (69) were males and 54% (81) were females that had cervical lymphadenopathy after skin preparation by chlorhexidine antiseptic solution showed frequency of infection in total of 150 patients 16.67% (25) were infected while the other 83.33%(125) were not infected. Out of 150 patients who were underwent cervical lymphadenopathy after using povidine iodine skin preparatory antiseptic solution, 42% (63) were males and 58% (87) were females and among those frequency of infection showed 44.67% (67) were infected while the others 55.33% (83) were not.

Conclusion: Preoperative scrubbing of the patient's skin with chlorhexidine–alcohol is better than scrubbing with povidone–iodine for preventing surgical-site infection after cervical lymph node biopsy.

Keywords: Povidine iodine, chlorhexidine, biopsy, lymphadenopathy

Introduction:

Lymph node are located throughout the lymphatic system, they are concentrated in certain areas of the body including head and neck. Cervical lymph nodes are lymph nodes found in the neck. Of the 800 lymph nodes in the human body, 300 are in the neck. Cervical lymph nodes are subject to a number of different pathological conditions including tumours, infection and inflammation (1). It is characterized not only by nodal swelling, but also by pain, skin changes, fever, oedema, and/or purulent collections (2).

Staphylococcal lymphadenitis, Mycobacterial lymphadenitis, Tuberculosis and Cat scratch fever are main causes of cervical lymphadenopathy (3, 4).

The majority of SSIs are caused by contamination of a surgical incision with bacteria from the patient's own body (5). Surgical site infection (6) is a dreaded postoperative complication that affects approximately 5% of all patients undergoing surgery (7). The use of preoperative skin preparation by effective antiseptic plays an important role in reducing postoperative

wound infection. There are several kinds of antiseptics available for preoperative skin preparation. There are several antiseptic skin cleansing agents available to the surgeon to use for patients undergoing clean, clean-contaminated, contaminated, and dirty surgery (5). Antiseptic and disinfectants are chemical agents used to reduce the microbial load of a surface, either living or inanimate object, depending on the concentration they can be bactericidal or bacteriostatic (8). The traditional antiseptic cleansing agent of choice is povidone iodine (PI). It is cheap, effective, and the most commonly used agent of choice worldwide (9). Chlorhexidine-alcohol (CHA) is a newer skin preparation agent, commonly composed of 2% chlorhexidine gluconate and 70% isopropyl alcohol (10). Although more expensive than PI, it represents an alternative skin antiseptic agent, is reported to have a more rapid onset of action than PI and has persistent activity in the presence of body fluids (11). Whole-body part bathing or showering with an antiseptic agent, such as 2% to 4% chlorhexidine gluconate, has been shown to reduce bacterial colonization of the skin (12). Studies have shown that the antibacterial effect of chlorhexidine is cumulative and lasts longer than that produced by povidone iodine (13, 14). Whereas some studies have shown that preoperative chlorhexidine showers reduce the incidence of SSI (15, 16).

According to a research held in 2009 and another held in 2010, Povidone-iodine has considerable spectrum and has been used for decades, with only few problems of contamination with gram-negative bacilli and allergic reactions (17, 18). It is still the standard of use in many institutions through the world. In a previous study, we reported that the antiseptics properties of sodium hypochlorite are not inferior to those of povidone-iodine (18). According to another research,

Chlorhexidine is currently recommended for skin preparation before surgery and insertion of the intravascular devices (19-21), nevertheless, chlorhexidine is an expensive substance, which limits its availability and distribution, especially in developing countries (18).

In operation theatre different antiseptics and chemical agents are used for preoperative skin preparation to prevent the SSI, but Povidone-iodine and chlorhexidine are most commonly used. The rationale of this research is to compare Povidone-iodine and chlorhexidine to minimize surgical site infection and postoperative complication. As well as to check which one of them is more reliable to kill microbes and give us wide range of antiseptics. The aim of this research is to suggest and provide the best antiseptic for preoperative skin preparation among the two most important and mostly used antiseptics i.e., Povidone-iodine and Chlorhexidine. So that the surgical site infection and postoperative complications can be minimized by using the antiseptic agent which is best one. In this way we may reduce the patients' stay in hospital after surgery.

Material and Methods:

Study design: Descriptive Study.

Setting: Surgical department of Gulab Devi Chest Hospital.

Duration: The duration of study was 6 months.

Sample size: 300 cervical lymphadenopathy undergoing patients were taken for the purpose to complete this study. Sample was calculated using $p=16\%$, $d=5\%$ using the following formula:

$$n = \frac{Z^2_{1-\alpha/2} P (1-P)}{d^2}$$

Sampling technique: Non-probability purposive sampling technique will use to collect the data.

Sample selection criteria: Patients undergoing cervical lymph node biopsy after

using either Povidine-iodine or chlorhexidine for preoperative skin preparation.

Data collection procedure: Povidine-iodine and chlorhexidine were used for preoperative skin preparation in cervical lymph node biopsy procedure and will ask them for follow up after a week. On follow up day their wounds were checked, assessed and withdraw all stiches and complications were recorded accordingly and analysed them. It was discussed and showed that which one of Povidine-iodine and chlorhexidine is best to use for preoperative skin preparation in cervical lymph node biopsy procedures to reduce surgical site infection and economical one.

Statistical analysis procedure:

The data was entered and analysed by using SPSS version 20. The quantitative data like age were presented in the form of mean \pm SD. While the qualitative data like gender were presented in the form of charts and tables along its percentage.

Results:

Descriptive statistics of age of patients for which chlorhexidine antiseptic was used is showed in Figure, descriptive statistic of age of patient for which povidine iodine antiseptic was used as skin preparatory solution is demonstrated in Figure and the comparison of both of the skin preparatory solutions is explained in Table.

Discussion:

In this research total of 300 patients of cervical lymph node biopsy were recruited which were distributed into two groups. On gender basis out of these 300 patients 150 patients 46% (69) were males and 54% (81) were females that had cervical lymphadenopathy for the biopsies of which chlorohexidine antiseptic was used. While the other 150 patients 42% (63) were

males and 58% (87) were females that had cervical lymphadenopathy for the biopsies of which povidine iodine antiseptic was used. In another study report a total of 897 patients were arbitrarily allocated to a study group: 431 to the chlorhexidine–alcohol group and 466 to the povidine–iodine group (21). A study conducted by Dumville and his colleagues found some substantiation that preoperative skin preparation with chlorhexidine was related with subordinate rates of SSIs subsequent to hygienic surgery than povidine iodine (22). The greater clinical efficacy of chlorhexidine–alcohol in our study compares well with previous microbiologic studies inspecting that chlorhexidine-based antiseptic preparations are more effective than iodine-containing solutions in reducing the bacterial concentration in the operative field (21). The aim of any type of pre surgical care and therapy is to enable fast healing and recovery by avoiding unwanted post-surgical complications due to infection, to shorten the duration and rate of post-surgical care and hospital stay (23). Preoperative skin preparation is one of the important resident factors regarding the development of surgical site infection. In another study, the authors controlled risk factors for development of surgical site infection except preoperative skin preparation using two different antiseptic agent (chlorhexidine vs povidine iodine) (24).

Conclusion:

Preoperative scrubbing of the patient's skin (skin preparation) with chlorhexidine–alcohol is better than scrubbing with povidone–iodine for preventing surgical-site infection after cervical lymph node biopsy.

Reference:

1. Eisenmenger LB, Wiggins RH. Imaging of head and neck lymph nodes. *Radiologic Clinics of North America*. 2015;53(1):115-32.

2. Gosche JR, Vick L, editors. Acute, subacute, and chronic cervical lymphadenitis in children. *Seminars in pediatric surgery*; 2006: Elsevier.
3. Zajonc RB, Murphy ST, Inglehart M. Feeling and facial efference: implications of the vascular theory of emotion. *Psychological review*. 1989;96(3):395.
4. Scully C, Kalantzis A. *Oxford handbook of dental patient care*: Oxford University Press, USA; 2005.
5. Women's NCCf, Health Cs. *Surgical site infection: prevention and treatment of surgical site infection*: RCOG Press; 2008.
6. Restrepo BI, Camerlin AJ, Rahbar MH, Wang W, Restrepo MA, Zarate I, et al. Cross-sectional assessment reveals high diabetes prevalence among newly-diagnosed tuberculosis cases. *Bulletin of the World Health Organization*. 2011;89:352-9.
7. Gottrup F. *Prevention of surgical-wound infections*. Mass Medical Soc; 2000.
8. Thomas V, McDonnell G. Relationship between mycobacteria and amoebae: ecological and epidemiological concerns. *Letters in applied microbiology*. 2007;45(4):349-57.
9. Hemani ML, Lepor H. Skin preparation for the prevention of surgical site infection: which agent is best. *Rev Urol*. 2009;11(4):190-5.
10. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR, Committee HICPA. *Guideline for prevention of surgical site infection, 1999*. *American journal of infection control*. 1999;27(2):97-134.
11. Block SS. *Disinfection, sterilization, and preservation*: Lippincott Williams & Wilkins; 2001.
12. Brandberg Å, Andersson I. Preoperative whole body disinfection by shower bath with chlorhexidine soap: Effect on transmission of bacteria from skin flora. *Skin Microbiology*: Springer; 1981. p. 92-7.
13. Byrne D, Napier A, Cuschieri A. Rationalizing whole body disinfection. *Journal of hospital Infection*. 1990;15(2):183-7.
14. Aly R, Malbach HI. Comparative antibacterial efficacy of a 2-minute surgical scrub with chlorhexidine gluconate, povidone-iodine, and chloroxylenol sponge-brushes. *American journal of infection control*. 1988;16(4):173-7.
15. Brandberg Å, Holm J, Hammarsten J, Schersten T. Postoperative wound infections in vascular surgery: effect of preoperative whole body disinfection by shower-bath with chlorhexidine soap. *Skin Microbiology*: Springer; 1981. p. 98-102.
16. Webster J, Osborne S. Meta-analysis of the use of antiseptics for pre-operative showering to prevent surgical site infection. *British Journal of Surgery*. 2006;93(11):1335-41.
17. Allegranzi B, Memish ZA, Donaldson L, Pittet D, Safety WHOGP, on Religious CTF. Religion and culture: potential undercurrents influencing hand hygiene promotion in health care. *American journal of infection control*. 2009;37(1):28-34.
18. Alvarez JA, Macias JH, Macias AE, Rodríguez E, Muñoz JM, Mosqueda JL, et al. Povidone-iodine against sodium hypochlorite as skin antiseptics in volunteers. *American journal of infection control*. 2010;38(10):822-5.
19. O'grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, et al. Guidelines for the prevention of intravascular catheter-related infections. *Clinical infectious diseases*. 2011;52(9):e162-e93.
20. Pronovost P, Needham D, Berenholtz S, Sinopoli D, Chu H, Cosgrove S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *New England Journal of Medicine*. 2006;355(26):2725-32.
21. Darouiche RO, Wall Jr MJ, Itani KM, Otterson MF, Webb AL, Carrick MM, et al. Chlorhexidine-alcohol versus povidone-

iodine for surgical-site antisepsis. *New England Journal of Medicine*. 2010;362(1):18-26.

22. Dumville JC, McFarlane E, Edwards P, Lipp A, Holmes A. Preoperative skin antiseptics for preventing surgical wound infections after clean surgery. *Cochrane Database Syst Rev*. 2013;3(3).

23. Yakubu A, Abubakar A, Salihu M, Jibril A, Isah I. Comparative Analysis of Chlorhexidine Gluconate, Povidone Iodine and

Chloroxylenol as Scrubbing Solution. *British Journal of Pharmacology and Toxicology*. 2010;1(2):93-5.

24. Paocharoen V, Mingmalairak C, Apisarnthanarak A. Comparison of surgical wound infection after preoperative skin preparation with 4% chlohexidine and povidone iodine: a prospective randomized trial. *Medical journal of the Medical Association of Thailand*. 2009;92(7):898.

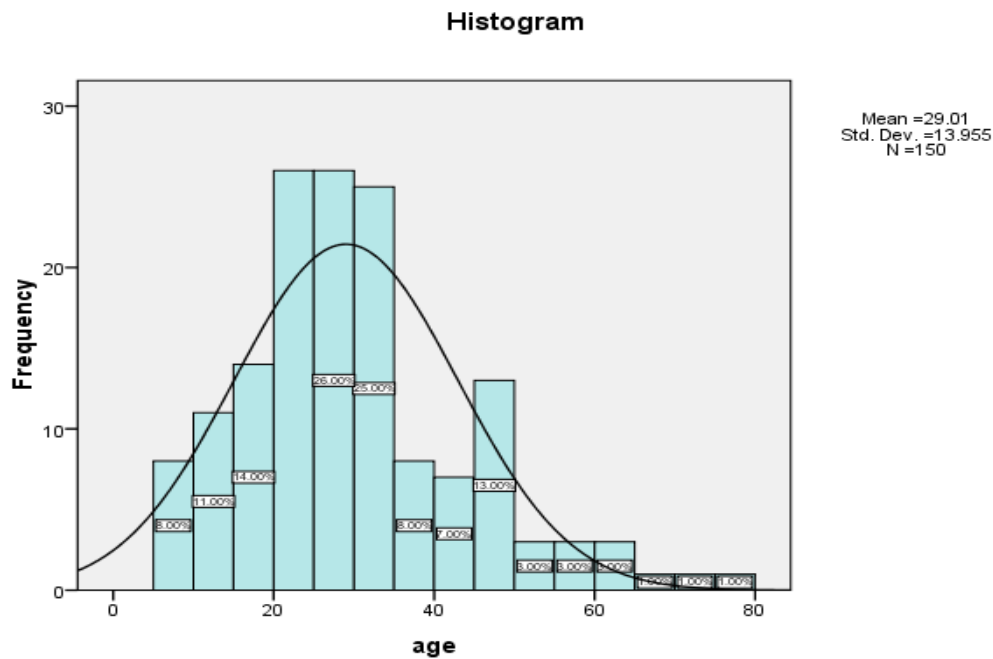


Figure 1. Descriptive Statistics of Age of Patients for Whom Chlorhexidine Antiseptic was used

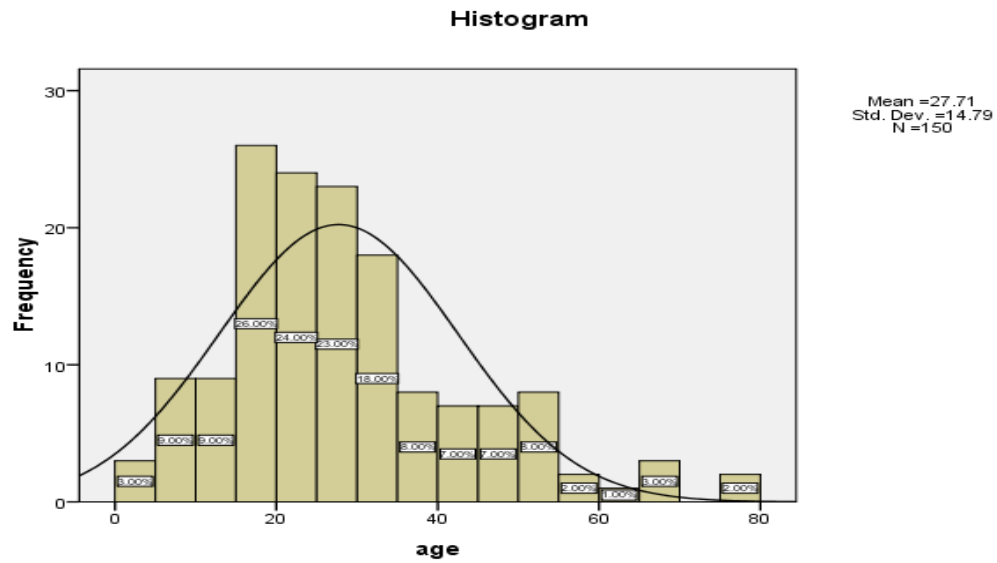


Figure 2. Descriptive Statistic of Age of Patient for which Povidine Iodine Antiseptic

Table 1. Comparison of Chlorhexidine and Povidine-Iodine Skin Preparatory Solution

Characteristics	Chlorhexidine skin preparation	Povidine-iodine skin preparation
Total patients	150	150
Male	46% (69)	42% (63)
Female	54% (81)	58% (87)
Infected	16.67% (25)	44.67% (67)
Not infected	83.33%(125)	55.33% (83)

Supplementary File 1:
Study Questionnaire

Name: _____

Serial #: _____

S/O, D/O, W/O: _____

Age: _____

Gender:

Male

Female

Address: _____

Reg. #: _____

Date: ____ / ____ / ____

Department: _____

Hospital: _____

Surgeon name: _____

Site of biopsy: _____

Antiseptics used:

Povidine-iodine

chlorhexidine

Post-op infection:

Infected wound signs & symptoms:

• Pain

Yes

No

• Redness

Yes

No

• Swelling

Yes

No

• Tenderness

Yes

No

• Pus

Yes

No

Wound infection:

Yes

No