Original Article

COMPARISON BETWEEN TOPICAL BACITRACIN AND NEOMYCIN WITH PYODINE FOR PROPHYLAXIS AGAINST WOUND INFECTION IN APPENDICECTOMY

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ABSTRACT

Objective: To compare the efficacy of prophylactic use of topical Bacitracin-Neomycin (Bivalek spray) with pyodine (solution) against wound infection in appendicectomy.

Study Design: Random control trial

Place and Duration of Study: Department of Surgery, Military Hospital Rawalpindi, Pakistan. One year from 15 Jan, 2007 to 14 Jan 2008.

Subjects: A total of 100 patients of acute appendicitis who underwent appendicectomy.

Method: Patients were randomly allotted to either group A in which the post appendicectomy wound sepsis was managed by using Bacitracin-Neomycin (n = 50) or to group B, in which wound was managed by using pyodine (n=50). Outcomes were measured by absence or presence of oedema, discharge from the wound and erythema at wound site, wound dehiscence or fistula formation.

Results: Comparison between two groups revealed infection rate of 14 % in group A and 8% in group B with no significant difference in wound infection (*p* value =0.388).

Conclusion: Topical Bacitracin-Neomycin (Bivalek Spray) is equally effective as pyodine for prophylaxis against wound infection after appendicectomy.

Keywords: Appendicectomy, Bacitracin-Neomycin, Pyodine, Wound infection

INTRODUCTION

Post operative wound infections remain a major source of illness in surgical practice[1]. World Health Organization demonstrated that wound infections account for 5-34% of the total hospital acquired infections. They account for 14-16% of the estimated two million nosocomial infections in the United States. Incidence of infection related to surgical wounds in the United Kingdom is as high as 10%. In Pakistan one study showed wound infection in 19.31% cases after appendicectomy[2].

Efforts are continuously made to reduce post operative infections. Prophylactic use of systemic antibiotics, many of which have been used either alone or in combination, has resulted in a significant reduction in wound infection rate[3]. Complications prolong the hospital stay and cost of management[4].

Pyodine is employed vastly universally in scrubbing preoperatively and in majority of wound dressing. Bacitracin-Neomycin spray is frequently used in patients post operatively especially in ICU set up in our hospital but there was no study available to support or refute this practice.

The objective of this study was to compare the efficacy of prophylactic use of topical Bacitracin-Neomycin (Bivalek spray) with pyodine (solution) against wound infection in appendicectomy. This study was the first of its kind ever done in this setup or even in Pakistan.

PATIENTS AND METHODS

These randomized controlled trials were carried out at General Surgery Dept of Military Hospital Rawalpindi from 15 Jan 2007 to 14th Jan 2008. One hundered patients were inducted on following criteria.

Inclusion Criteria

- Age 12 – 50 years.
- Both male and female.
- Patients presenting with periumblical colic, right iliac fossa pain, anorexia /vomiting.

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- Right iliac fossa tenderness.

Exclusion Criteria

- Terminally ill patients.
- Uncontrolled diabetes mellitus.
- Immuno-comprised patients.
- Patients allergic to Bacitracin-Neomycin or pyodine.

Data Collection

After detailed history, and clinical examination 100 patients of acute appendicitis, fulfilling the inclusion criteria were selected. Informed written consent was obtained from all the patients by explaining to them the therapeutic intervention (appendicectomy) and its possible outcomes. All information was filled in a proforma containing details of name, age and gender.

Patients were divided into two groups A & B using random number tables. In group A Bacitracin-Neomycin was used. In group B pyodine was applied. One dose of pre-operation and two doses of post operation intravenous antibiotics (Metronidazole 500 mg 8 hourly, Ampicillin 500 mg 8 hourly and Gentamicin 80 mg 8 hourly) were given.

Dressing was changed on 2nd post op day and wound examined for swelling, redness and discharge. Subsequent dressing was done with Bacitracin - Neomycin or pyodine according to group. Patients were discharged on 2nd post op day if there was no erythema, swelling or discharge from wound.

Postal address along with telephone numbers of all the patients was recorded in the proforma and researchers contact number was given to each patient for future consultation or any query by the patient, regarding post operative complications including surgical site infection. Stitches were removed on first follow up visit on 9th post op day. Patients followed up, on weekly basis for 4 weeks.

On each follow up patients were examined for swelling, redness and discharge from wound and wound dehiscence hence the topical effectiveness efficacy of the antiseptics was compared.

Data analysis

After collection of data, it was analyzed using Statistical Package for Social Sciences (SPSS) version 16. Mean and standard deviation was calculated for age. Frequency (percentage) was calculated for (qualitative data) gender, wound erythema, wound discharge and dehiscence. Student's t-test was used to compare age between groups for significance of difference. Chi-square test was used to compare gender, wound erythema, wound discharge and dehiscence between groups for significance of difference. Statistical significance was taken as $p < 0.05$.

RESULTS

Our study included 100 patients divided into two equal groups. There were 11 (22%) males and 39 (78%) females in group A and 8 (16%) males and 42 (84%) females in group B.

In 1st week there were three (6%) cases that had oedema in group A and one case (2%) in group B. Oedema and erythema were noticed predominantly in second week (Table). Serous or sero-purulent discharge was noticed in three (6%) cases at the end of 1st week in group A and two (4%) cases in group B (P=0.842). No case presented with frank purulent discharge or faecal fistula in both groups. Almost all cases from each group had similar pattern of manifestation of infection. Erythema and discharge were most frequent signs of infection in both groups.

At four weeks of observation based on clinical signs, it was noticed that infection occurred in 14 % cases in group A and 8 % in group B(P value=0.338) (Figure).

DISCUSSION

Wound infection is the most common post operative complication of appendicectomy. Almost all patients undergoing appendicectomy receive intravenous antibiotics and use of topical antiseptics is limited especially over last 20 years. There are concerns that even with use of parenteral antibiotics wound infection still remains most common post op complication. So an attempt was made to study the usefulness of addition of topical antibiotics to routinely used intravenous

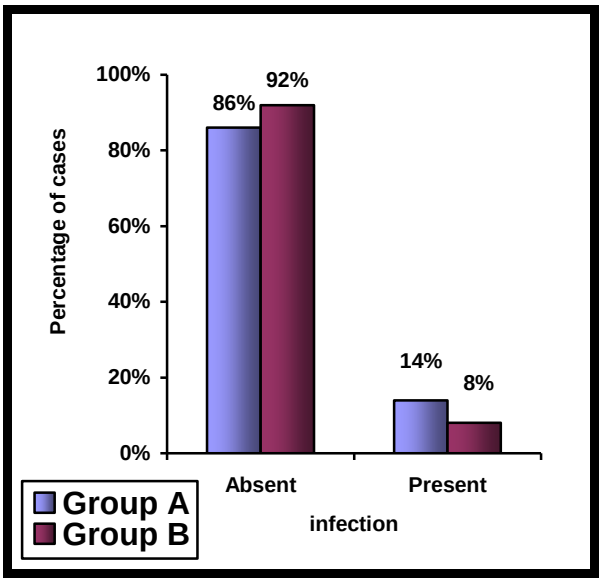

Figure: Overall infection in each group (n=50).

received sterile normal saline irrigation to the surgical wound. In Group II, intra-operative topical ampicillin irrigation of the wound was done. All patients additionally received preoperative systemic gentamicin and metronidazole. Wound infection occurred in 5.3% of Group I compared to only 0.9% in Group II ($P<0.05$)[5]. It was concluded that the addition of intra-operative topical ampicillin to systemic antibiotics help prophylaxis against wound infection in acute appendicitis. In our study infection rate was considerably high, 8%(with pyodine) and 14%(with Bacitracin-Neomycin) even when compared with normal saline irrigation. This may be contributed to early presentation of patients, better sterilization of the instruments and awareness of asepsis among theater staff, in their study.

Table: Patients with signs of wound infection at weekly intervals. (n=50) in each group.

Signs of infections	weeks	Group A (n=50)		Group B (n=50)		p-value
		No	%	No	%	
Oedema	1	3	6	2	4	0.646
	2	6	12	3	6	0.294
	3	1	2	0	0	0.315
	4	0	0	0	0	1.000
Erythema	1	3	6	3	6	1.000
	2	6	12	2	4	0.140
	3	3	6	1	2	0.307
	4	0	0	0	0	1.000
Discharge	1	3	6	2	4	0.646
	2	7	14	2	4	0.081
	3	3	6	1	2	0.307
	4	1	2	1	2	1.000
Dehiscence	1	3	6	1	2	0.307
	2	6	12	3	6	0.294
	3	4	8	1	2	0.169
	4	0	0	0	0	1.000

antibiotics and to compare the two, topically applied medicines.

Pyodine is used in cases of surgery in preparing skin before draping the operative area. Bacitracin-Neomycin (Bivalek Spray) in the form of aerosol were employed for comparison. Commonly used antiseptics are povidone, chlorhexidine, hydrogen peroxide and silver nitrate.

Al-Shehri et al compared 2 groups of patients undergoing appendicectomy. Group I,

Eklund and Tunevall studied that use of 0.2% Tinidazol irrigation in non perforated appendicitis after peritoneum closurein comparison with normal saline irrigation and showed a significant improvement with Tinidazol irrigation (2% Tinidazole versus 13% Normal saline) in reduction in wound infection (P=0.02)[6]. Our study is consistent analogue with this study with comparable infection rates (8% Pyodine-14% Bacitracn-Neomycin, in our study group).

Seco, Ojeda observed that combined use of clindamyc in and ampicillin significantly reduced wound infection to 4%, compared with clindamycin alone. A decrease in the surgical wound infection rate in the group treated with clindamycin and ampicillin was mainly observed in patients with advanced (gangrenous and perforated) appendicitis. A significant decrease in wound infection rates in patients with positive culture results was also found. So they concluded that prophylaxis with a combination of systemic clindamycin and topical ampicillin solution, when compared with clindamycin alone, is more effective in preventing wound infection after emergency appendectomy, especially in patients with serious wound contamination[7].

The effect of using topical povidone-iodine spray in addition to a single dose of intravenous metronidazole was studied in a clinical trial involving 200 patients undergoing appendicectomy. Despite the metronidazole, patients with perforated or gangrenous appendices still had an unacceptably high rate of wound infection[8]. Overall, no benefit resulted from the addition of the povidone-iodine spray. Here our results fail to comply with the results of this study.

Sherlock et al concluded that Single dose of clindamycin hydrochloride and gentamicin sulfate preoperatively, combined with intraoperative topical application of pyodine reduced wound sepsis from 36% to 5%. When used alone, pyodine had little effect[9]. Our results are more consistent with this study as wound infection rate was 14% and 8% with Bacitracin/Neomycin and Pyodine respectively.

Gerald and McGreal compared the pyodine soaked wicks in post appendicectomy wound with subcuticular closure and found that later was more promising. The cases treated with pyodine soaked wicks had 11.6 % wound infection rate as compared to 5.6 % in subcuticular closure[10]. So in this study the use of pyodine wicks as antiseptics was not favoured. This is in contradiction with our study. The idea behind their work was to have a combination both primary and secondary healing because a small gap was intentionally left to allow the contact of gauze with wound subdermally. They removed wick on fourth day. It might have been detrimental for healing due to daily soakage of it by pyodine making a constant moist pyodine contact.

Ein and Sandler studied 453 children over a period 26 years who underwent appendicectomy for wound infection. They concluded that patients with preoperative (or intraoperative) intravenous antibiotics (cefoxitine) plus wound antibiotic powder (cefoxitine) had the lowest infection rate (2.5%). When this group was compared with the baseline group 1 (no treatment), it was the only group in which wound treatment made a significant difference[11]. They concluded that topical antibiotics along with intravenous antibiotics are more useful in appendicectomy.

An increase in the number of published prospective studies reflects a continuing interest in but lack of consensus on, the optimal prophylaxis of wound sepsis after appendicectomy. For critical comparison of prophylactic regimens the high percentage of wound infections disclosed after discharge from hospital must be taken into account. Antibiotics reduce the frequency of wound sepsis and although low wound sepsis rates have been reported with systemic antibiotics active against only anaerobes, the cumulative evidence favours a spectrum of antibacterial activity against both aerobic and anaerobic organisms. Topical antiseptics have no significant effect but topical antibiotics are beneficial. In our case both (antiseptic—Pyodine, antibiotics—Bacitracin-Neomycin) found equally effective statistically as there was no significant difference between the efficacy of the two (*P* value=0.338). Wide variations in outcome for similar antibiotic regimens reflect the importance of technical factors in determining the frequency of wound sepsis[12].

There has been no study on topical use of Bacitracin-Neomycin in post appendicectomy wound management .Wound infection rate of 8% to 14% was observed in our study which is comparable to pyodine wicks 11.6 %. These agents alone are not sufficient in preventing

wound infection after appendicectomy. They are supplemental to intravenous antibiotics.

Although the results statistically show that Bacitracin-Neomycin and pyodine are equal we should continue pyodine in managing post appendicectomy wound as it is cheap, easily available and the most widely used antiseptic.

CONCLUSION

It is concluded that Bacitracin-Neomycin is as effective as Pyodine for prophylaxis against wound infection after appendectomy as there was insignificant difference in superficial surgical site infection when used in addition to intravenous antibiotics.

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