

Topical Application of Povidone Iodine to Minimize Post Appendectomy Wound Infection

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Abstract

Background: Despite the use of prophylactic antibiotic and sterilization techniques and numerous methods of wound care, post appendectomy wound infection is still high.

Methods: A randomized control study (RCS) has been implied to prove, whether uses of povidone iodine just prior to wound suturing could decrease surgical wound infection rates after surgery for appendectomy. A total number of 120 patients operated for acute appendicitis with open appendectomy at AL-Mawani Teaching Hospital during the period from March 2016 to October 2020.

Results: After appendectomy patients were randomized into three groups, group A which include 40 patients the subcutaneous tissue was irrigated with 1% diluted povidone-iodine solution before skin closure. Group B which contained other 40 patients the wound has been washed with normal saline, and in group C (control group) no irrigation was done. All patients were followed for surgical site infection according to Southampton wound grade system for ten days after surgery. In this study we notice that a reduction happened in the number of wound infection in group A compare with group B and C.

Conclusion: The uses of povidone iodine 1% before skin closure is an effective method in reducing the rate of infection of the wound after surgery for acute appendicitis.

Keyword: Povidone iodine, wound infection, Acute appendectomy

Introduction

Acute appendectomy is a common surgical emergency in a wide range of ages and sexes. Post appendectomy wound infection is a frequent complication after appendectomy even by the use of antibiotic before surgery as prophylaxes and proper sterilization

techniques, percentage of post appendectomy wound infection are quite high reaching to 18% -20%^(1,2). Povidone iodine is composed of iodine, iodide and polyvinyl pyrrolidone dissolved in sterilized water. Data had been shown that its action against bacteria will be increased by dilution in a range between 0.1–1% and its effect as bactericidal will be more than 10% strength⁽³⁾, at this concentration it is neither toxic to the tissue cells or interfere with healing of the wound and has been FDA approved for short course therapy to prevent superficial wounds infection⁽³⁻⁶⁾. The present study was designed to compare the efficacy of povidone –iodine 1% irrigation versus normal saline irrigation and no irrigation applied

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to the wound before closure. Importance of this study as if 1% povidone-iodine decreases. The surgical site infection, then it will be a simple and inexpensive remedy for prevention of surgical site infection.

Methods

A prospective randomized controlled study was conducted in the surgical units of AL– Mawani Teaching Hospital, Basrah, Iraq, from march 2016 to October 2020. It included patients from the two sexes who were brought to the hospital with a diagnosis of acute appendicitis with the aid of clinical, laboratory and radiological investigations and confirm during operation, later by histopathological studies of the removed appendices. A total number of 120 patients above 13 years of age (55 female and 65 male) who underwent open appendectomy via a grid iron incision. We exclude patients who were sensitive to prophylactic antibiotic use in the study (third generation cephalosporin), patient with immune deficiency (diabetic mellitus, chronic renal failure, chemotherapy, radiotherapy or corticosteroids therapy).

All patients were given 1gram of third generation cephalosporin intravenously as prophylaxis against infection at induction of anesthesia.

In this study **group A**, before skin closure, subcutaneous tissue was irrigated by 1% povidone-iodine using 10cc syringe, kept there for 2 to 3 minute and then aspirated. **Group B** the subcutaneous tissue was washed by normal saline using 10cc syringe. **Group C** no irrigation was done.

Skin closure was done by interrupted sutures and then aseptically dressed. Other two doses of ceftriaxone 1gm given postoperatively intravenously. Patient examined for surgical site infection after 10 days in the outpatient clinic.

Results

In this study we included a total number of 120 patients [65 male (54.16%) and 55 female (45.84%)]. All patients ages were from 13-45 years. The wound of the patients was examined post operatively after tendays,

and had been graded by using Southampton grading system into 5 grades (0 – 4) as in figure 1, 2, 3. Surgical site infection in Southampton grading system was from grade II and above. It was presented in overall 24 (20%) of patients. In group A it presented in six patients (15%) and in group B eight patients (20%) and in group C ten patients (25%).

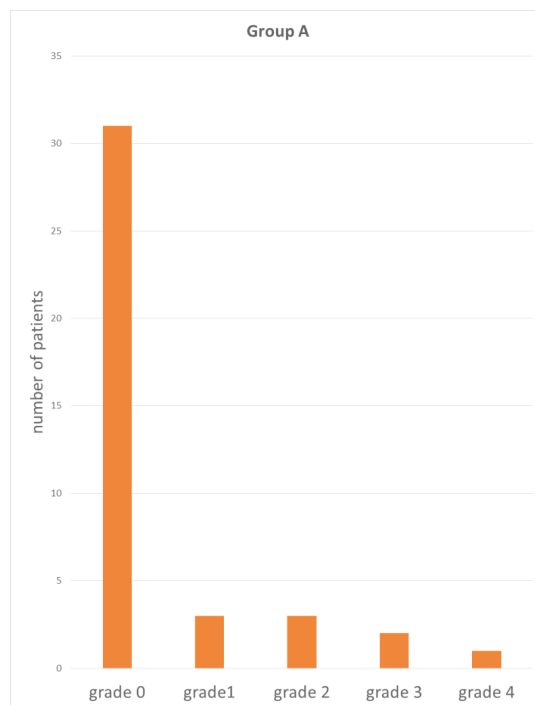


Figure 1. Relation between Group A and Grading.

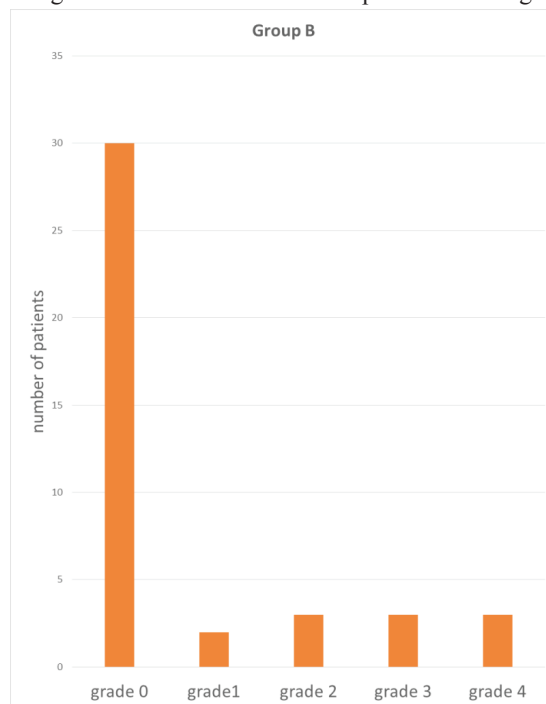


Figure 2. Relation between Group B and Grading.

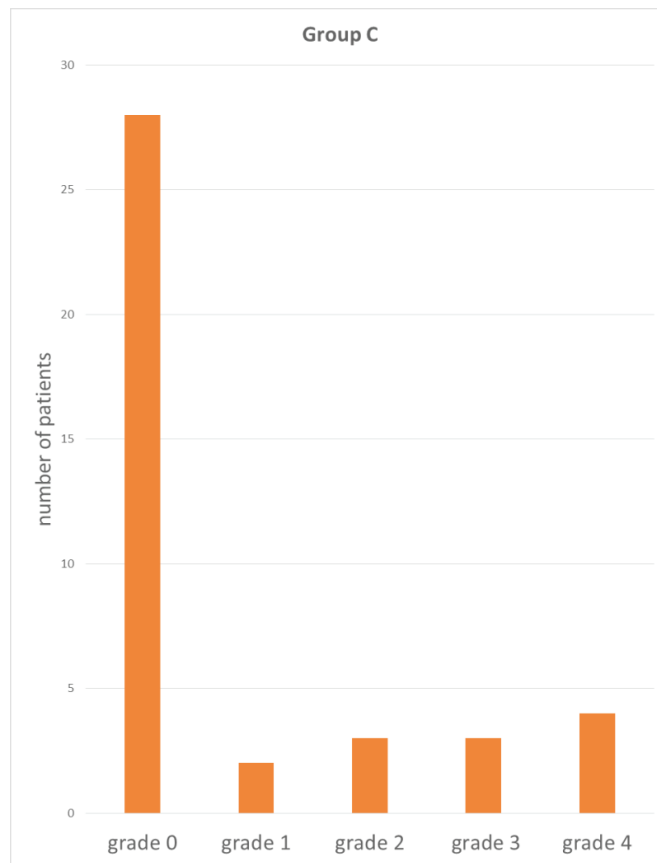


Figure 3. Relation between Group C and Grading.

Table 1. comparison of wound infection between the three groups following appendectomy.

Wound grade by Southampton	No. N = 120	Group A Povidone irrigation N = 40	Group B NS wash N = 40	Group C No irrigation N = 40
	N(%)			
Grade 0: healing is normal	89 (74.167%)	31 (77.5 %)	30 (75%)	28 (70%)
Grade I: normal healing + mild bruising	7 (5.834%)	3 (7.5 %)	2 (5%)	2 (5%)
Grade II: erythema / tenderness / heat	8 (6.6%)	3 (7.5%)	2 (5%)	3 (7.5%)
Grade III: serous discharge	8 (6.6%)	2 (5%)	3 (7.5%)	3 (7.5%)
Grade IV: purulent discharge	8 (6.6%)	1 (2.5%)	3 (7.5%)	4 (10%)

Discussion

In this study we try to compare the three methods and substances. That may assist in decreasing the rate of the infection in the surgical wound. After appendectomy we notice that the rate of wound infection was decrease.

In group A When we use syringe irrigation with 1% povidone – iodine (15%) In comparison with group B in which we use syringe irrigation with normal saline (20%). And in group C in which no irrigation was used to (25%).

The wound infection is due to operative contamination and many ways are used to reduce Such contamination⁽⁷⁾. many factors play a role in postoperative wound infection, including perioperative and intraoperative care and management with evaluation of any surgery to reduce infection rate⁽⁸⁾. wound wash and debridement are important for wound healing as shown by many experimental trauma cases⁽⁹⁾.

In surgical wound infection pus discharge from the wound indicate infective process. this pus discharge is believed to be due to production of inflammatory mediators.

Antiseptics are substances that kills or inhibit the microorganisms growth, so it will reduce the formation of pus in the wound cavity^(3,4). Sindelar and Mason study show that wash of abdominal and urological wound with 10% povidone-iodine solution will lead to reduce pus formation from the wound⁽¹⁰⁾. The study done by Hiramatsu and colleagues show that there is a benefit from use of povidone-iodine applying to the wound in reducing wound infection postoperatively⁽¹¹⁾.

Conclusion

The present study we conclude that wound syringe irrigation with diluted 1% povidone- iodine is a safe way, low cost and currently available in any theater room which does not interfere with healing process and it will significantly reduced the surgical site infection and pus formation.

Conflict of Interest : The authors declare no conflicts of interest.

Funding : This study was unfunded.

Ethical Clearance- Taken from AL– Mawani Teaching Hospital committee

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