

Rate of wound infection after clean surgery

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ABSTRACT

Objective: The aim of this study is to determine the rate of wound infection after clean surgical operations without using of prophylactic antibiotics and to investigate the relation between surgical wound infection with patient's age, sex, type of hospital, and the difference in surgeons.

Methods: This study carried out in Sana'a city on 238 patients who underwent clean operations in two governmental and two private hospitals by four surgeons between 1998-1999. Patients at high risk of infection were excluded.

Results: The rate of wound infection was 8%. The study revealed statistically significant difference ($P=0.011$) in the infection with elderly patients (25% infection in elderly patients compared with 6% in less than 60 years old patients). It was also found that wound infection rate differs with the difference in surgeons; the rate did not

exceed 3% with one surgeon (the author) in comparison with 13% with other surgeons. This difference is statically significant ($P= 0.003$). Differences in rates of infection with sex of the patient and type of the hospital were statistically insignificant.

Conclusion: The study was concluded that the rate of wound infection after clean surgery without prophylactic antibiotics in Yemen is higher than many other countries, surgeon and the age of the patient were the risk factors of importance. It is suggested to give antibiotics as prophylaxis to elderly patients and to rise the awareness of the surgeons and nurses in order to improve their practice.

Keywords: Clean surgery, infection, patient's age, surgeons.

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Administration of antibiotics as prophylaxis against wound infection for most clean operations has been considered inappropriate.^{1,2} This is because of the risk of infection is too low to justify the use of antibiotics.³ However antibiotic prophylaxis can not compensate the correction of medical problems and meticulous surgical technique. Clean operations constitute approximately 60% of all surgical procedures.⁴ Many Yemeni surgeons use antibiotics in therapeutic doses for all clean operations. On top of financial costs due to irrational use of antibiotics, it may also lead to some side effects. These include allergic reactions, antibiotics associated colitis, drug interaction, reduce colonization resistance, which cause infection with resistant microorganisms,⁵ drug

toxicity, change in antimicrobial susceptibility and alteration in gastrointestinal flora.⁶ In a 10-year prospective study of 62,939 wounds, revealed that the rate of postoperative wound infection without using antibiotics in clean surgeries in USA was less than 2%.⁷ Gil-Egea et al showed in a prospective, four year, study in the USA a rate of post-operative infection after 4,468 clean surgeries without prophylactic antibiotics of 3%. They also found that ages over 65 years did not influence infection rate while it were up to tenfold between surgeons performing the same procedure.⁸ In Zimbabwe, Ojiegbe and associates found that the rate of post-clean surgery infection was 14%,⁹ 3% was the clean wound infection rate in Malaysia as Abu Hanifa

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Table 1 - Characteristic of patient, place and surgeon in Sana'a city, 1999.

Characteristic		Number (%)
Sex	Male	150 (63)
	Female	88 (37)
Age in years	<60	218 (92)
	>60	20 (8)
Hospital	Estate	124 (52)
	Private	114 (48)
Surgeon	The author	132 (55.5)
	Others	106 (44.5)

revealed.¹⁰ Platt and associates conducted a randomized, double blind, placebo-controlled evaluation of antibiotic prophylaxis in patients undergoing breast and hernia operations and their sequel. The results revealed that wound infection rates did not differ significantly between the treatment and the control groups.¹¹ From other view, prophylactic antibiotics use in operations is indicated when the risk of post-operative wound infection is high or in which the rate of wound infection is relatively low but the consequences of infection are significant.¹² High risk of post-operative wound infection may be due to either preoperative variables that may introduce more microorganisms or due to factors related to the patient. The preoperative variables include scrubbing time, skin antiseptics, surgical aseptic technique, duration of procedure, presence of an implant or drain and duration of the preoperative hospitalization.¹ Factors related to the patient include; diabetes, obesity, extremes of age, recent surgery, use of corticosteroid,¹³ female patient, malnutrition, low serum albumin and long use of antibiotic.¹⁴ By giving antibiotic prophylaxis only to patients at high risk, the incidence of post-operative wound infection can be reduced.¹⁵ The present study aims to estimate the rate of post-operative wound infection in clean surgery without use of prophylactic antibiotics in hospitals in Sana'a city and to investigate the risk factors related to surgeon, place and patient characteristics.

Methods. This study describes the outcomes of postoperative wound infection in clean operations without use of prophylactic antibiotics conducted for 238 cases during 1998-1999. The surgeries were

carried out in Sana'a city, capital of Yemen; in 2 governmental and 2 private hospitals. The subject ages ranged between 2-85 years. There were 24 different clean operations. One hundred and twenty four were carried out in estate and 114 in private hospitals. The first surgeon did 132 and other three surgeons did 106 operations. Wound considered infected according to clinical criteria after operation until stitch removal. These are hotness, redness, tenderness, swelling and presence of pus. Patients at high risk for infection (diabetics and malnourished) were excluded from the study. Data about patient, hospital and surgeon were filled in a data sheet. Then entered in a personal computer and processed with SPSS program version 9 to calculate percentages and Chi-square.

Results. Male to female ratio of the subjects was found to be 1.7:1. Males were 150 and females were 88; 66 (75%) of the females underwent operations by the author. Fifty two percent of operations were carried out in governmental hospitals and the author did 55% of them see Table 1. Postoperative wound infection was diagnosed in 18 (8%) subjects out of 238 subjects underwent clean operation. Postoperative wound infection was positively correlated with old age and other surgeons as shown in Table 2.

Discussion. An overall rate of postoperative wound infection in clean surgeries without prophylactic antibiotics was 8%. This rate is higher than those rates found by Cruse,⁷ Gil-Egea⁸ and Abu-

Table 2 - Postoperative wound infection in relation to patient, place and surgeon in Sana'a city, 1999.

Characteristic		Total number	Rate of infection	P-value
Sex	Male	150	10	0.050
	Female	88	3	
Age in years	<60	218	6	0.011
	>60	20	25	
Hospital	Estate	124	8	0.477
	Private	114	7	
Surgeon	The author	132	3	0.003
	Others	106	13	
P-values were calculated for Chi square tests				

Hanifa,¹⁰ and lower than Ojiegbe.⁹ This difference might be due to absence of infection control team in the studied hospitals in Yemen. In addition, admission of patients in the same room irrespective to type of operation could play a role in elevating the rate of infection.

The rates of post-operative infection between different surgeons have a statistical difference where it was lower in surgical operations carried out by the author and his team (3%) than those of other surgeons (13%). The reason for that may be because of applying gentle delicate technique and handling, shaving skin in the theater just before operation, antiseptic used in preparations (Povidin iodine in the case of the author), doing surgeries as short as possible and subcuticular suturing. The difference between surgeons is less than the rates reported by Ojiegbe,⁹ comparable with Gil-Egea⁸ and Abu-Hanifa¹⁰ and higher than Cruse's study.⁷ This finding implies recommending a research to study differences in surgeons' techniques.

With respect to higher rates among old age (25%, 6%), this finding is comparable to that revealed by Isidore¹ but differs from Gil-Egea.⁸ This implies administration of prophylactic antibiotics to old age patients. Infection in males (10%) did not differ statistically than females (3%). This finding is contradictory to that found by Pasternak.¹⁴ This can be interpreted as 75% of females underwent surgical operations, were carried out by the author and his team.

The study was concluded that the rate of wound infection after clean surgery without prophylactic antibiotics in Yemen is higher than many other countries, surgeon and the age of the patient were the risk factors of importance. It is advised to give antibiotics as prophylaxis to elderly patients and to rise the awareness of the surgeons and nurses in order to improve their practice.

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