

Global Infectious Complications (Gic) Score to Predict Surgical Site Infection for Lichtenstein Herniorrhaphy at Moh. Hoesin General Hospital Palembang, Indonesia

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ABSTRACT

Background: *Herniorrhaphy* is the most often procedure conducted in abdominal operation. The usage of prolene mesh is the gold standard in inguinal hernia operation, however its usage increases the incidence of surgical site infection. In 2005, Global Infectious Complications (GIC) scoring system was developed to predict the risk of surgical site infection after *herniorrhaphy* procedure.

Objective: To predict the incidence of surgical site infection after *Lichtenstein herniorrhaphy* operation conducted in Moh. Hoesin Central General Hospital, Palembang based on GIC Score.

Method: This prognostic study was designed as a cohort study and were performed from June 2019 until October 2019. There were 34 *inguinal hernia* patients and were divided into 2 groups of surgical site infection risk based on GIC score. 23 samples were grouped in lower risk while 11 samples were grouped in high risk. *Lichtenstein herniorrhaphy* procedure was conducted

using prolene mesh and the patients were observed for one month for any occurrence of surgical site infection.

Conclusion: GIC score could not be used to predict the surgical site infection for *Lichtenstein herniorrhaphy* operation for patients receiving treatment at Moh. Hoesin General Hospital, Palembang, Indonesia.

Keywords: GIC Score, *Herniorrhaphy Lichtenstein*, Global Infectious Complications Score (GIC)

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INTRODUCTION

Herniorrhaphy is the most common abdominal surgical procedure often conducted to repair weakness in abdominal wall which causes hernia. It was estimated that more than 20 million surgeries involving hernia corrections were conducted annually around the world.¹ In America alone, there were more than 990,000 *herniorrhaphy* operations performed each year further depicting the severity of the problem². The high incident of post-operative complications leads to the usage of bio-material prolene called as mesh (*Lichtenstein* technique) and has ever since become the gold standard in inguinal hernia surgery.³ However, mesh application also leads to higher incidence of infection as compared to mesh-free surgery where the rate of infections was reported to be as high as 8%.⁴

Surgical Site Infection (SSI) is the type of infection which occurs in the tissues, organs or cavities which are inserted, opened or manipulated in surgical procedures.⁵ For abdominal surgery like *Lichtenstein herniorrhaphy*, there were 37% chances of infection incidence at the surgical wound area.⁶ SSI causes an increased use of antibiotics, extend the duration of care as well as increasing the cost of care which leading to financial burden for after-care therapy.

Patrick Pessaux et al. in 2005 constructed a scoring system that can be used to predict the risk of post-operative *herniorrhaphy* surgery infection, which named as the GIC (*Global Infectious Complications*) score.⁸ This score has a score of - 4.7 to - 0.55 and a cutoff point of - 4.2 with a 61% sensitivity and 85% specificity. The group with less than -4.2 marks will be grouped into low risk while more than -4.2 will be considered

as high risk group. The purpose of this pioneer scoring system was to determine the need for antibiotic prophylaxis which needed to be administered only for high risk group and thus discarding the need for the treatment in low risk group, preventing its unnecessary financial implication. There were 3 variables used to assess this score namely age, obesity and the use of urethral catheter which in line with WHO Guideline for Safe Surgery (2008).⁹ These three variables are the predominating risk factors of contracting SSI. Thus, this study is conducted to assess whether GIC can be used to predict surgical site infection in patients receiving treatment at Moh. Hoesin Hospital, Palembang, Indonesia.

RESEARCH METHODOLOGY

The study population consisted of all patients who underwent elective surgery in the Department of Digestive Surgery Moh. Hoesin General Hospital, Palembang, Indonesia from June to October 2019. There were 34 patients involved in this research which the inclusion criteria for sample selection was the patients who had *Lichtenstein herniorrhaphy* surgery and were over 17 years old as well as having good BMI. The exclusion criteria were unwillingness to follow the study, scheduled for more than one surgical procedure, receive oral or intravenous steroid therapy during perioperative periods, as well as patients which received antibiotic therapy at least one day prior to surgery.

The drop out criteria was the patients who could not being followed up again for various reasons as well as patients who have to undergo surgery again to cope with the emerging complications.

All the patients involved in this study were between 17 to 90 years old, have BMI <30 and were not obese. The patients' data were collected from the preoperative stage and were followed-up for 30 days post-operation. *Univariate* data was presented in the form of distribution and frequency table, graphs and narratives. Chi-square test was conducted to analyze the difference in the ratio of surgical site infection incidence in high and low risk groups in the first, second, third and the fourth week.

The surgical site infections were assessed using *Southampton* wound score and were assessed weekly for a month. The data was processed and analyzed statistically using SPSS software version 16.0.

RESULTS

Based on the *GIC* scores, the risk of surgical site infection is classified into low and high risk group. Out of the 34 respondents, majority of them (67.6%) have a low risk of getting SSI.

The inguinal hernia distribution was highest on the right side of 25 people (73.5%) while inguinal hernia occurred on the left side of 9 people (26.5%). Preoperative care at the subject ranged from 1 to 6 days, which the average was for 2 days (41.2%). All research patients have blood glucose levels within normal limits before surgery. Blood sugar levels were 166 mg / dl and the lowest was 83 mg / dl. A total of 19 (55.9%) patients underwent the surgery have preoperative smoking habits. The surgery was conducted by surgical residents of digestive surgery of Moh. Hoesin General Hospital. The *Lichtenstein herniorrhaphy* surgery operation took between 45 minutes to 120 minutes. The incidence of surgical site infection was assessed using the *Southampton Injuries Scores* in both risk groups.

Pearson Chi-Square analysis method on *GIC* scores variables in both groups was conducted to assessed any significant different of SSI over the course of observation. The results of Fisher's Exact Test (significant level at $p < 0.05$) that was conducted in each week was tabulated in Table 1 below.

TABLE 1. Fisher's Exact test value for both high and low risk groups based on *GIC* score

WEEK 1							
GCI Score	Grade 0		Grade 1		Grade 2		p value
	n	%	n	%	n	%	
High Risk	5	45.5	4	36.4	2	18.2	0.078
Low Risk	9	39.1	14	60.9	0	0	
WEEK II							
GCI Score	Grade 0		Grade 1		Grade 2		p value
	n	%	n	%	n	%	
High Risk	6	54.5	5	45.5	0	0	0.434
Low Risk	17	73.9	6	26.1	0	0	
WEEK III							
GCI Score	Grade 0		Grade 1		Grade 2		p value
	n	%	n	%	n	%	
High Risk	10	90.9	1	9.1	0	0	1.000
Low Risk	22	95.7	1	4.3	0	0	
WEEK IV							
GCI Score	Grade 0		Grade 1		Grade 2		p value
	n	%	n	%	n	%	
High Risk	6	54.5	5	45.5	0	0	0.4344
Low Risk	17	73.9	6	26.1	0	0	

Bivariate analysis using 2x3 tables on the occurrence of SSI in both risk groups reveals that there is no significant difference between the two groups. Thus, the results indicate that both group have similar probability of contracting SSI.

DISCUSSION

This study is a prognostic test with cohort design to find out the occurrence of surgical site infection post *Lichtenstein herniorrhaphy* surgery based on *GIC* score in Moh. Hoesin

General Hospital, Palembang, Indonesia. In this study, there was no incident of SSI post-surgery during one-month observation which the wound was assessed using *Southampton* wound assessment scale. Nevertheless, normal tissue reactions were found in the form of oedema and erythema in few subjects at the site of surgical wound. However, there was no bacterial infections detected. Several studies have shown that increased risk of surgical wound infections is proportional to the increase in age.^{10, 11, 12}

The study conducted by Cheadle (2006) concluded that there was an increased risk of surgical wound infection of 1.1% per year between the ages of 17 - 65 years, but there was a reduction in risk for patients age over 65 years.¹¹ The differences in the tissue reaction at incision site may also be attributed to the decrement of inflammatory response which commonly occurs in old age.¹³

The absence of SSI observed in both groups might also due to the nature of *Lichtenstein herniorrhaphy* surgery being a clean surgery.³ In net operations such as *herniorrhaphy*, the average infection rate is 0.9% which can be considered low as compared to other invasive surgeries.¹⁴ The absence of SSI in this study may attributed to the high effectivity of prophylactic antibiotics that were used as well as the possibility of research subjects consuming antibiotics orally and independently. In this study however, the sample size used is relatively smaller than the pioneer research conducted by Pessaux et al., 2006 and hence might influence the data obtained.⁸

Besides age, obesity status and the usage of urinary caterer, several confounding factors may also affect the occurrence of SSI which include long-term care, smoking habits, surgery operators as well as operational techniques. In this study however, the influence of confounding factor is very minimal and thus the probability of affecting the result is nominal.

CONCLUSION

From the result of this research, there is no difference in the occurrence of surgical site infection between high and low risk group which were categorized using Global Infectious Score (GIC). Thus, this score could not be used as a tool to measure the probability of SSI incidence for *Lichtenstein herniorrhaphy* procedure conducted at Dr. Moh. Hoesin General Hospital Palembang, Indonesia.

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