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AGENTS RELATED TO AN OPERATIVE SITE INFECTION IN OPERATED OLDER ADULTS AT THE NAVAL MEDICAL CENTER, 2013 - 2017

AGENTES RELACIONADOS A INFECCIÓN DE SITIO OPERATORIO EN ADULTOS MAYORES POS OPERADOS EN EL CENTRO MÉDICO NAVAL, 2013 – 2017

Lucía Fernanda Hidalgo-Vizarreta[1], Magdiel José Manuel Gonzales-Menéndez[2,a,c], Cecilia Roxana Salinas-Salas[2a,b]

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ABSTRACT

Introduction: Surgical site infections (SSI) are part of the most frequent intrahospital infections in the postoperative period of elderly patients. **Objective:** To determine the agents related to infections of the operative site in the elderly patients after surgery of the Naval Medical Center during January 2013 to December. **Methods:** An analytical cross sectional study using a secondary data analysis from clinical records of patients older than 65 years post-operated. SSI was studied has outcome, and arterial hypertension, diabetes mellitus, malignant neoplasia, obesity, surgical technique and type of surgery were the agents. **Results:** Of the 219 older adults, 33.33% (n=73) had SSI. In the bivariate analysis, statistically significant associations were found for diabetes mellitus (PR: 1.49, CI 1.03 - 2.18, p <0.035), type of surgery (PR: 4.63 IC 2.89 -7.42, p <0.05) and surgical technique (PR.0.24, CI 0.13- 0.43, p <0.05). In the multivariate analysis, it was found that emergency type surgery has 4.04 (PR 4.04, IC 2.55 - 6.40, p <0.05) times chance for SSI compared to the programmed surgery, and the laparoscopic technique surgery has 0.29 (PR 0.29, CI 0.17-0.52, p <0.05) chance of SSI compared to the open technique. **Conclusion:** Laparoscopic operative technique decreases the likelihood of ISO, and emergency surgery increases its likelihood in elderly patients.

Key words: Elderly; Surgical Site infection; Type of surgery; Surgery. (source: MeSH NLM)

RESUMEN

Introducción: Las Infecciones de Sitio Operatorio (ISO) son parte del grupo de infecciones intrahospitalarias más frecuentes en el posoperatorio de los pacientes adultos mayores. **Objetivo:** Determinar los agentes relacionados a infecciones del sitio operatorio en pacientes adulto mayores pos operados en el Centro Medico Naval "Cirujano Mayor Santiago Távara" (CEMENA) de enero 2013 a diciembre 2017. **Métodos:** Estudio de diseño casos y controles, analítico y observacional. Se estudiaron las variables ISO como desenlace e hipertensión arterial, diabetes mellitus, neoplasia maligna, obesidad, técnica quirúrgica y tipo de cirugía como agentes. **Resultados:** De los 219 adultos mayores, el 33,33 % (n=73) tuvieron ISO. En el análisis bivariado se encontraron asociaciones estadísticamente significativas para diabetes mellitus (OR: 1,49, IC 1,03 – 2,18, p<0,035), tipo de cirugía (OR: 4,63 IC 2,89 -7,42, p<0,05) y técnica quirúrgica (OP,0,24, IC 0,13- 0,43, p<0,05). En el análisis multivariado, se encontró que la cirugía de emergencia tiene 4,04 (OR 4,04, IC 2,55 - 6,40, p<0,05) veces la probabilidad de ISO en comparación a la cirugía programada, y la cirugía laparoscópica tiene 0,29 (OP 0,29, IC 0,17-0,52, p<0,05) veces la probabilidad de ISO en comparación con la técnica abierta. **Conclusión:** La técnica operatoria laparoscópica disminuye la probabilidad de ISO, y la cirugía de emergencia aumenta su probabilidad en pacientes adultos mayores.

Palabras clave: Adulto mayor; Infección de sitio operatorio; Cirugía. (fuente: DeCS BIREME)

[1] Naval Medical Center Hospital "Santiago Távara", Lima-Peru.
[2] Research Institute in Biomedical Sciences, Ricardo Palma University, Lima-Peru.
[a] Surgeon physician.
[b] Geriatrics Specialist.
[c] Specialist in General Surgery.

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INTRODUCTION

Operative Site Infections (OSI) are the second most common cause of in-hospital infections in Health Centers 1 causing a longer hospitalization, disability, and sequelae in the patient with an obvious economic impact 1. These usually appear within 30 days after surgery, being commonly between day five and ten of the postoperative period 1,2 In hospitals in the United States it is estimated that about 300,000 OSI are produced annually, resulting in several billions of dollars in potentially avoidable medical costs 2 and it is estimated that between 40 and 60% of OSIs in the world is preventable 2,3 In Peru, between January 2013 and December 2014, it was notified to the the epidemiological surveillance system of In-hospital infections (ESSIHI) that the OSI increased from 214 to 249 with 77.5% (n = 190) reported in regional governments and in the Institute of Health Services Management (IGSS), 9.6% (n = 24) in private health facilities, 8.8% (n = 22) in Essalud, 3.2% (n = 8) in the Armed and Police Forces and 0.8% (n = 2) in local and mixed governments[4].

The process of aging of human beings is a natural, progressive and irreversible process that worldwide in recent years, is subject to an increase in life expectancy and therefore must be subject to a better quality of life. This population is characterized by having a pattern of comorbidities, which from the surgical point of view are decisive for the emergence of some complications during their complete hospital stay. Identifying these comorbidities and associated conditions will reduce both intra-operative and postoperative complications to achieve not only a good surgical act but a successful one[5,6].

METHODS

Case and control design study, analytical and observational, through secondary data analysis from a base generated by CEMENA in the Surgery Service. There was a sample of 219 patients from the CEMENA Surgery Service; operated between 2013 and 2017, with probabilistic sampling. It was set as a variable OSI dependent. The independent variables were gender, obesity, military-grade, arterial hypertension, diabetes mellitus (DM), malignancy, type of surgery and surgical technique. In the statistical analysis, predictive models of logistic regression type and generalized linear models with a level of statistical significance of p <0.05 were applied by using the Stata 14 program for Windows (StataCorp LP, College Station, TX, USA).

RESULTS

There was a sample of 219 older adults, of the patients with ISO, 33.08% (n = 43) were male and 33.71% (n = 30) of the female sex, 66.73% (n = 72) had a military degree (junior, official); in addition, 39.13% (n = 36) arterial hypertension, 41.05% (n = 39) DM, 34.78% (n = 16) showed some malignancy, while 32.05% (n = 25) was obese. On the other hand, 56 older adults presented OSI after emergency surgery, which represents 61.54% of the total sample and 48.09% (n = 63%) of the total presented this same complication after one surgery performed with open technique. For complementary data, review table 1.

Regarding the bivariate analysis of ISO, through the use of logistic regression, statistically significant associations were found for DM (OR: 1.49, CI 1.03 - 2.18, p <0.035), type of surgery (OR: 4, 63 IC 2.89-7.42, p <0.05) and surgical technique (OR: 0.24, CI 0.13-0.43, p <0.05). For additional data, review table 2.

Regarding the multivariate analysis, the OSI variable was adjusted for statistically significant variable variables of the bivariate analysis (DM, type of surgery and surgical technique). After the analysis, associations were found with the type of surgery (OR: 4.04, CI 2.55-6.40, p <0.05) and surgical technique (OR: 0.29, CI 0.17-0, 52, p <0.05). This is interpreted as follows: Emergency surgery has 4.04 times the probability of occurrence of ISO compared to scheduled surgery, and laparoscopic technique surgery has 0.29 times the probability of OSI compared to the open technique. For additional data, review table 3.

Table 1. Population and surgical characteristics according to operative site infection.

	Operating Site Infection	
	No	**Yes**
Sex		
Female	59 (66.29%)	30 (33.71%)
Male	87 (66.92%)	43 (33.08%)
Military Grade		
Junior	84(70%)	36 (30%)
Official	62(63.27%)	36 (36.73%)
Civil	0	1 (100%)
Arterial hypertension		
No	90 (70.87%)	37 (29.13%)
Yes	56 (60.87%)	36 (39.13%)
Mellitus diabetes		
No	90(72.58%)	34 (27.42%)
Yes	56 (58.95%)	39 (41.05%)
Malignant neoplasm		
No	116 (67.05%)	57 (32.95%)
Yes	30 (65.22%)	16 (34.78%)
Obesity		
No	93 (65.96%)	48 (34.04%)
Yes	53 (67.95%)	25 (32.05%)
Type of Surgery		
Scheduled	111 (86.72%)	17 (13.28%)
Emergency	35 (38.46%)	56 (61.54%)
Surgical technique		
Open	68 (51.91%)	63 (48.09%)
Laparoscopic	78 (88.64%)	10 (11.36%)

Table 2. Bivariate analysis of Operative Wound Infection.

	Operative Wound Infection		
	RP	**IC**	**p**
Sex	0.98	0.67-1.44	0.922
Military grade	1.292	0.89-1.88	0.18
Hypertension	1.34	0.93-1.95	0.12
Diabetes mellitus	1.49	1.03-2.18	0.035
Malignant neoplasm	1.06	0.67-1.65	0.813
Obesity	0.94	0,63-1.39	0.766
Type of surgery	4.63	2.89-7.42	p<0.05
Surgical technique	0.24	0.13-0.43	p<0.05

Table 3. Multivariate analysis of Operative wound infection.

	Operative Wound Infection		
	RP	IC	p
Mellitus diabetes	1.33	0.98-1.79	0.065
Type of surgery	4.04	2.55-6.40	p<0.05
Surgical technique	0.29	0.17-0.52	p<0.05

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DISCUSSION

Aging is a phase of our life cycle, which has its own characteristics some more pleasant than others that manifest themselves progressively according to extrinsic and intrinsic factors. Estimates from the National Institute of Statistics and Informatics (INEI, Spanish initials) indicate that by 2018 the elderly population represents 11.9% of the general population; finding a population increase of 1% in the last 10 years[7]. This constitutes a population group whose interest cannot be separated from the quality of life, nor from the identification of factors that could influence them, either in the out-of-hospital or in the hospital. In the specific case of the postoperative period, the elderly population has certain clinical characteristics that predispose them to situations such as operative site infections[8].

Our study shows that 41.05% of the elderly population with diabetes mellitus presented OSI being a figure comparable to that of a systematic review where it is determined that the probability of generating OSI is greater than 40%[9]. On the other hand, there is a 32% obesity frequency and OSI, data close to those reported in a cohort study where a frequency of 40 to 60% is determined[10].

Regarding the factors associated with OSI, it was found that the probability of an OSI occurring after an emergency surgery was 4.04 compared to the scheduled surgery, which is supported by other studies with similar findings since in non programmed surgeries, pre-hospital conditions cannot be adequately controlled and in many cases immediate surgical intervention is urgent in the face of life risks[11,12,13]. On the other hand, it is determined that Laparoscopic Technique Surgery has 0.29 times the probability of OSI compared to the open technique; which would show that the risk of OSI is lower when laparoscopic surgery is performed. Different studies have shown that the laparoscopic technique has a lower rate of infections thanks to the lowest degree of exposure to germs[14,15]. In both cases, although the preceding literature establishes these parameters without making differences between elderly patients and the general population, additional studies should focus on this age group[16,17].

When the DM comorbidity was analyzed in the sample, it was initially signed in the bivariate analysis, however in the multivariate, it was not significant, this is because it is possibly a confusing factor. This may be due to an insufficient sample size that prevented an adequate comparison. Additional studies should be considered to generate higher levels of evidence related to comorbidities and OSI.

LIMITATIONS OF THE STUDY

The study is unicentric, and the number of cases is compensated with the controls.

This type of study only allows us to detect possible associations, and generate future hypotheses of a cause-effect relationship, compared to multicenter, longitudinal and prospective studies.

CONCLUSION

Laparoscopic operative technique decreases the probability of OSI, and emergency surgery increases the probability of OSI in elderly patients.

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Correspondence: *Lucía Fernanda Hidalgo Vizarreta*

Address: *Avenida S/N, Av. República de Venezuela, Bellavista, lima-Perú*

Telephone: *+51 994377166*

E-mail: *luciahidalgo94@gmail.com*

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