

Prevalence of myocardium revascularization wound infections surgery

Prevalência de infecções em suturas de cirurgias de revascularização do miocárdio

Taciane Procópio ASSUNÇÃO¹, Breno César Diniz PONTES², Carlos Américo Veiga DAMASCENO³

RBCCV 44205-1244

Abstract

Objective: To study the prevalence of wound infection on myocardial revascularization surgery stitches as well as the microorganisms Causing, predominant fri, acts and try to correlate it with the APACHE risk.

Methods: A retrospective and transversal study, with analysis of the files of the 21 Patients with infected wounds myocardial revascularization operated Among 357 Patients Between the years of 2007 and 2009. Were the files checked on 2009.

Results: There was in statistics Analyzing the Significance of the fri Patients. The average of Patients Were old aged and the prevalence is similar to the index found in literature, But There Are Variations about the microorganisms found all over the years.

Conclusion: Besides the raise of wound infections along the three years, the prevalence Kept stable, once the numbers of surgeries maid raised proportionately. Fri Significant is not a variable to the Occurrence of

myocardium revascularizations wound infection. Old aged people are more predictable to this complication and the microorganism is Causing variable.

Descriptors: Infection. Infection Control. Myocardial Revascularization. Surgical Wound Infection. Postoperative Complications.

Resumo

Objetivo: Estudar a prevalência de infecção nas suturas decorrentes de cirurgia de revascularização do miocárdio e também os microorganismos causadores, sexo predominante e idade.

Métodos: Trata-se de um estudo retrospectivo, transversal, com análise dos prontuários dos 21 pacientes que apresentaram infecção na ferida operatória de cirurgia de RM, dentre os 357 pacientes operados entre os anos de 2007 e 2009. Os prontuários foram analisados durante o ano de 2009.

1. Undergraduate Medicine (Third Year Student of the Faculty of Medicine Dr. Jose Antonio Garcia Coutinho - UNIVÁS).
2. Specialization Title Specialist in Infectious Diseases. Brazilian Society of Infectious Diseases, SBI, Brazil. Master in Health Sciences University of Vale do Sapucaí, UNIVÁS, Brazil. (Infectologist of the Hospital das Clínicas Samuel Libânio. Assistant Professor of the DIP discipline of the University of University of Vale do Sapucaí, UNIVÁS).
3. Master in Biological Sciences (Microbiology) from the Federal University of Minas Gerais and a PhD in Biological Sciences (Microbiology) from Universidade Federal de Minas Gerais (Professor of Microbiology and Immunology, University of Itana, MG and the University of Higher Education Vale do Sapucaí in Pouso Alegre, Brazil.)

Study conducted at Hospital das Clínicas Samuel Libânio, Pouso Alegre, Brazil - Universidade Vale do Sapucaí - UNIVÁS.

Mailing address: Taciane Procópio Assunção
Rua Fernando Antônio de Lemos, 394 Ponte Preta. CEP: 37490-000. São Gonçalo do Sapucaí – MG
E-mail: taciane_assuncao@hotmail.com

This work was supported by the fund to support faculty research (pivic), and a voluntary exchange. Only the material needed for research (in the case leaves office, pens, printing and biostatistics) was provided. The author and co-authors received no financial incentive to carry out the project.

Article received on August 12, 2010
Article accepted on November 9, 2010

Resultados: Não foi encontrada significância estatística ao se analisar o sexo dos pacientes. A maioria dos pacientes era idosa e a prevalência da infecção está dentro da média encontrada na literatura, havendo variação dos microrganismos encontrados ao longo dos anos.

Conclusão: Apesar do número total de infecções ter aumentado ao longo dos anos, a prevalência se manteve estável, uma vez que o número de cirurgias realizadas

aumentou proporcionalmente. Sexo não é uma variável significativa à ocorrência de infecção na ferida cirúrgica. Idosos estão mais predispostos a esta complicação e o microrganismo causador é variável.

Descritores: Infecção da Ferida Operatória. Revascularização Miocárdica. Complicações Pós-Operatórias. Infecção.

INTRODUCTION

Infection in surgery can be regarded as being the result of the invasion, proliferation, metabolic activity and consequent pathophysiological effects of microorganisms on tissue from an individual. Constitutes the most common complication of tissue synthesis, becoming a constant worry for surgeons. Their incidence is affected by a number of variables, for example, the degree of contamination of the wound, the surgical technique and materials used for synthesis [1].

One of the types of infections resulting from coronary artery bypass grafting is occurring in sutures. The incidence of these should be the same as for any clean surgical procedure, ie around 2%. However the infection rate reaches three times among patients with heart disease, because they had more risk factors than the general population. As for deep wound infection, the incidence is 0.5% to 5% [2].

Due to the higher susceptibility to infection demonstrated in cardiac patients by their weakness, the high costs of treating these infections cause and intensity with which they occur, was studied by De Feo [3] in cardiac surgery patients often do happen and trying to relate some variables to their incidence.

In cardiac surgery, surgical wound infection by *Staphylococcus aureus*, and increased length of hospital within 30 days, significantly increases mortality. Hospital infection, surgical site infection is the second most frequent cause, surpassed only by urinary tract infection. The microorganisms most commonly associated with surgical site infection are *Staphylococcus aureus*, coagulase negative and Gram-negative [4].

This study aims to examine the surgical site infections occurred in surgeries such as CABG its causing microorganisms in order to study the local microbial flora and to correlate its incidence with age and sex of patients.

METHODS

This is a retrospective study, in which during the period

1 January 2007 to December 31, 2009, 357 patients underwent coronary artery bypass grafting in Hospital Samuel Libanius, a university hospital in the town of Pouso Alegre, Brazil.

Of all patients who underwent coronary artery bypass grafting, 21 had infections due to the intervention, and were classified as surgical site infection through the HICC (Commission on Hospital Infection Control) that follows the parameters of the NIS. Their charts were reviewed in 2009 and 2010.

The variables analyzed were gender, age, organisms found at points of infection and the prevalence of these infections in HCSL.

This study was approved by the Ethics in Research Committee of Vale do Sapucaí, registration number 1038/08.

To analyze the results, we applied the chi-square [5], in order to compare the years 2007, 2008 and 2009 regarding the presence of infections.

RESULTS

During the year 2007 were 101 coronary artery bypass grafting. Of this total, six patients (5.94%) had infection in post-surgical suture.

In 2008, there were 119 surgeries, and seven (5.88%) developed infection of the suture.

In 2009, 137 surgeries were performed and eight (5.88%) developed infection.

During these three years, two deaths were recorded, but none due to surgical infection.

The chi-square analysis showed no significant difference between the years 2007, 2008 and 2009 when compared in terms of percentage of cases with infection, with an average of 3 years 5.88% (Table 1).

No significant changes in the distribution of patients according to sex (Figure 1).

The patients were predominantly elderly, with a mean age of 65. The average age of patients over the three years is at Table 2.

Table 1. Total number of patients undergoing coronary artery bypass grafting in the years 2007, 2008 and 2009, and the number of patients who developed infection of the suture. The percentage of people in relation to the total sample is also correlated. These are infections that occurred in the suture of coronary artery bypass grafting.

Years	Infected		Total	% of infected patients
	Yes	No		
2007	6	95	101	5.94
2008	7	112	119	5.88
2009	8	129	1337	5.84
Total	21	336	357	5.88

Table 3. Distribution over the years of the microorganisms found in the sutures of infected patients. The number of cultures not performed in patients with infection of the suture is also correlated.

	Non-performed cultures	Micro-organisms found
2007	4	Enterobacter cloacae
		Klebsiela pneumoniae
2008	5	Serratia mascescens
		Enterobacter cloacae
		Escherichia coli
2009	2	Klebsiela sp
		Staphylococcus aureus
		Enterobacter cloacae
		Klebsiela pneumoniae

**Distribution of patients according to gender
Analysis of the years 2007 to 2009**

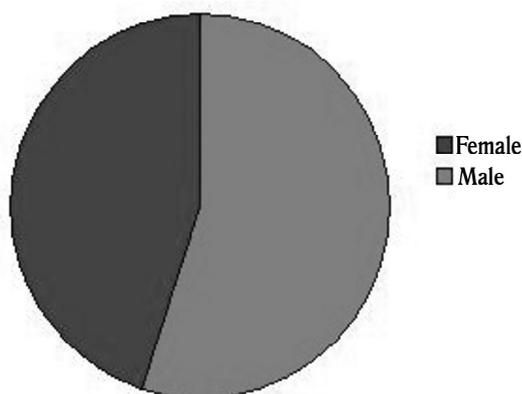


Fig 1 - Distribution of the population who had surgical site infection after coronary artery bypass grafting in relation to sex

Table 2. Average age of patients undergoing surgery who developed surgical wound infection in each study period and the entire sample.

	2007	2008	2009
Mean Age of patients	66.5	64.1	65.4
Total Mean			65.33

There was no predominance of a single microorganism found in the culture made from the material collected from patients infected sutures. The microorganisms found are displayed in Table 3.

DISCUSSION

The study population was predominantly elder (aged 50 to 83 years, with an average age of 65 years).

Numerous studies have shown that women undergoing coronary artery bypass grafting (CABG) present during hospitalization, higher mortality rate and often complications when compared to men, being the first of these papers attributed to Bolooki et al. [6]. These conclusions, however, have not been uniform, and some publications even after the correction of these factors, clinical and anatomical, females still related to higher mortality and complications as if there were something inherently linked to sex, and not yet clarified, leading to worse outcomes during hospitalization. One should also note that in some series, especially in recent years, these differences in hospital mortality between men and women have no longer been observed, the authors argue that improvements in surgical technique and possibly the perioperative care would overcome the old difficulties in relation to females [6].

In this study, however, there was no significant difference between the sexes, being almost equal for females and males (Figure 1).

Analyzing the Table 1, one notices a progressive increase in the number of cardiac procedures performed. 81% of patients were older than 60 years of age. This goes against published by Weinstein et al. [7], reporting the progressive increase in the number of elderly patients who present to the Department of cardiac surgery (Table 3).

Sternal wound infection after cardiac surgery can be a serious complication. The reported incidence of sternal infections ranges from 0.9% to 20%. The pathogens that cause postoperative infections were reported in the study Ridderstolpe et al. [8] and the most common coagulase-

negative *Staphylococcus* and *S. aureus*. Among patients cultured, the pathogen was isolated from wound *S. coagulase-negative*, accounting for 36/91 (39.6%) infections. The second most common pathogen, *S. aureus*, which causes 15/91 (16.5%) and more common in mediastinitis (80%) than in patients with deep wound infections (20%). Other pathogens responsible for sternal infection and mediastinitis was propionic, *Acinetobacter*, *Enterobacter cloacae*, *Escherichia coli* and *Klebsiella*.

In the study by Harbarth et al. [9], superficial infections detected in 231, culture was performed in 76% (176). In 70% (123 of 176) of which there was growth of microorganisms of which: 52 were coagulase-negative staphylococci, 21 enterococci and 51 Gram-negative, and *S. aureus* was not frequently found (n = 15). Gram-negative *Enterobacter* spp were the most common (n = 8), *Serratia* spp (n = 11) and *Pseudomonas aeruginosa* (n = 11).

The microorganisms most commonly associated with surgical site infection are *Staphylococcus aureus*, coagulase negative and Gram-negative [4].

In this study, there was a predominance of a single microorganism. The culture was performed in 47% of infected patients (10/21), and of these four *Klebsiella* (pneumoniae by three and one sp.), Three were infected by *E. cloacae*, two by *S. marcescens*, three *S. aureus*, and *E. Coli* (Table 2). The average number of infections in surgical sutures CABG was 5.88%, staying within the parameters presented by other authors (Table 1).

In a study by Couto et al. [10] related to infections, superficial and deep surgical site in patients. Despite the favorable developments have been considered and no deaths have occurred, surgical intervention was required in three patients.

None of the patients studied evolved to death due to infection of the suture of coronary artery bypass grafting, but one had to be reoperated for removal of foreign body (in this case, the steel wire).

CONCLUSION

The number of infections in surgical sutures of CABG increased over time, but in proportion to the increase in surgeries, maintaining, therefore, the percentage of infections stable.

Much of the surgery are elderly, confirming that age is a risk factor for developing infections, even perfunctory. Yet we found no correlation with sex. Men and women have the same potential to develop superficial wound infection.

The microorganisms are similar to those found in other cardiac surgery services, with the difference that none of the patients died after wound infection. There is a predominance of bacteria on the other, there is a very heterogeneous impact over time. There was no progress to

sepsis. Of all patients with surgical site infection, only one had to be reoperated for removal of foreign body (granuloma formed with the suture).

The results for the isolated microorganisms showed the need to focus more on the culture and sensitivity, which would increase the prophylactic measures that could reduce the morbidity and costs hospitals to treat infections of postoperative wounds.

REFERENCES

1. Fonseca FP, Rocha PRS. Cirurgia ambulatorial. Rio de Janeiro: Guanabara Koogan; 1979. 424p.
2. Antoniali F, Costa CE, Tarelho LS, Lopes MM, Albuquerque APN, Reinert GAA, et al. O impacto de mudanças nas medidas de prevenção e no tratamento de infecções incisionais em cirurgia de revascularização do miocárdio. Rev Bras Cir Cardiovasc. 2005;20(4):382-91.
3. De Feo M, Renzulli A, Ismeno G, Gregorio R, Della Corte A, Utili R, et al. Variables predicting adverse outcome in patients with deep sternal wound infection. Ann Thorac Surg. 2001;71(1):324-31.
4. Abboud CS. Infecção em pós-operatório de cirurgia cardíaca. Rev Soc Cardiol Estado de São Paulo. 2001;5(11):915-21.
5. Siegel SE, Castellan Jr NJ. Estatística não paramétrica para ciências do comportamento. 2ª ed. Porto Alegre: Artmed; 2006. 448p.
6. Amato VL, Timerman A, Paes AT, Baltar VT, Farsky PS, Farran JA, et al. Resultados imediatos da cirurgia de revascularização miocárdica: comparação entre homens e mulheres. Arq Bras Cardiol 2004;83(spe):14-20.
7. Weinstein MC, Coxson PG, Williams LW, Pass TM, Stason WB, Goldman L. Forecasting coronary heart disease incidence, mortality, and cost: the Coronary Heart Disease Policy Model. Am J Public Health. 1987;77(11):1417-26.
8. Ridderstolpe L, Gill H, Granfeldt H, Ahlfeldt H, Rutberg H. Superficial and deep sternal wound complications: incidence, risk factors and mortality. Eur J Cardiothorac Surg. 2001;20(6):1168-75.
9. Harbarth S, Samore MH, Lichtenberg D, Carmeli Y. Prolonged antibiotic prophylaxis after cardiovascular surgery and its effect on surgical site infections and antimicrobial resistance. Circulation. 2000;101(25):2916-21.
10. Couto WJ, Branco JNR, Almeida D, Carvalho AC, Vick R, Teles CA, et al. Transplante cardíaco e infecção. Rev Bras Cir Cardiovasc. 2001;16(2):141-51.