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A randomised controlled trial of mini incision or conventional incision for saphenous vein harvesting in patients undergoing myocardial revascularization

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HIGHLIGHTS

- Benefits of with mini-incision surgery for saphenous vein stripping have been demonstrated.
- We present a technique without aid of special material.
- The number of postoperative complications was smaller and evolved faster.
- With this technique there is no increase in hospital costs and nor of the team's curve learning.

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ABSTRACT

Objective: Compare the evolution regarding the complications concerning two types of incision (conventional × mini-incision), for saphenectomy in patients that go under myocardial revascularization or otherwise known as coronary artery bypass surgery.
Methods: In January 2012 to August 2013, 66 patients were prospectively selected for coronary artery bypass with cardiopulmonary bypass surgery. These were divided into two groups: Conventional and Mini-Incision, with 33 patients in each group chosen in a random fashion and with knowledge of which technique to be used being presented only at the start of the surgery. In the conventional group, the patients received an incision to the lower member of 7–10 cm. The patients in the Mini-Incision group received an incision to the lower member of 3–4 cm, both performed without the use of any special material.
Results: The groups were similar in terms of clinical data and in the preoperative period. Males made up a greater part of the group with 63.7% and 81.9% in groups C and M, respectively. Among the complications analysed, edema ($p = 0.011$), hematoma ($p = 0.020$), dehiscence ($p = 0.012$) and infection ($p = 0.012$), were significantly greater in group C when compared to group M. When the matter comes to the variable in relation to the risk of Surgical Site Infections (SSI), no difference was found between the groups.
Conclusion: Coronary artery bypass surgery with mini-incision for saphenectomy, demonstrated a lower rate for preoperative complications when compared to saphenectomy under conventional incision procedures.
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1. Introduction

Cardiovascular diseases (CVD) are among the primary causes of death worldwide: more people die annually from cardiovascular related diseases than any other cause [1].

Coronary Artery Disease (CAD) occurs in greater frequency through the obstruction of the coronary artery by atheromatous plaques and usually affects individuals with stenosis of the epicardial arteries [2].

Surgical Coronary artery bypass, is generally indicated for those

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patients where clinical treatment is unable to control angina pectoris or those that have an elevated level of arterial obstruction, which thus elevates their risk to a life threatening one. In general, these are patients that present diffuse coronary lesions, with involvement of more than one coronary territory along with the involvement of vital arteries, such as the left main coronary artery and the left anterior descending branch [3].

Although the use of arterial conduits for grafts in coronary artery bypass surgery has grown over recent years, the saphenectomy technique used for obtaining the venous graft during surgical intervention, is still one of the most commonly performed procedures worldwide. Usually, the dissection of the great saphenous vein is performed through the open surgery technique with single or staggered incisions. Complications related to the surgical technique, occur in 30% of the patients submitted to a saphenectomy. Hematoma, seroma, suture dehiscence, necrosis around the edges of the incisions or infections, increase hospital stay periods and delay patient rehabilitation. DeLaria et al. revealed an increase of 12 days in hospital stay due to complications at the saphenectomy site. This incurred an increase of US$ 9900 per patient in hospital costs linked to these patients [4].

Complications of a lesser degree that lead to cicatrisation difficulties can affect up to 44% of patients. Infections associated with the lower members is around 99% more common than on the sternal incision, this in most cases represents the main grievance of postoperative patients [5].

New saphenectomy techniques have been proposed with the aim of decreasing postoperative complications. Chukwuemeka and John proposed initiating the leg incision 5 cm above the medial malleolus and extend it proximally, avoiding more distal areas. Saphenectomy performed with small staggered incisions was one of the first techniques to be proposed. This is basically performed through the use of minimally applied intercalated incisions along the saphenous vein, creating an interposition of skin “islands”. Tevaearai et al. report speedier recovery from surgery for patients where the mini-incision technique was used, which through avoiding large skin flaps and promoting a lesser degree of lesions in lymphatic vessels, attains an improved aesthetic result [4].

Minimally invasive techniques performed by means of endoscopic and non-endoscopic instruments, with the intention of further decreasing surgical incisions and improve the visualization of the saphenous vein have been advocated since 1996. This methodology brings about a reduction in trauma to fatty tissues, decrease in lesions to skin nourishing vessels and postoperative infections. Pagni et al. showed a 60% reduction in the risk of infection in saphenectomy patients through the use of video-assisted techniques [4].

Initial results have demonstrated that less invasive procedures do provide effective surgical treatment, along with accelerate patient recuperation, decrease hospital stay time and reduce the overall cost. This path of minimally invasive dissection of the saphenous vein has attracted the attention of various researchers. Preliminary studies with the use of video-endoscopy, has demonstrated that limited surgical incisions are capable of reducing postoperative mortality. However, video-endoscopy surgeries require the acquisition of new abilities and equipment. The initial period for the learning curve can hamper results as well as the inherent necessity of investment for the acquisition of these materials may become a prohibitive factor for many institutions [5].

Aimed at reaching the benefits of the minimally invasive approach, however, without the use of video-endoscopy, brought about the study for alternative methods through which the saphenous vein could be obtained. Through mini-incisions and the aid of a long and narrow blade retractor, one is able to dissect the required segment of vein. In 1997, Dias et al. presented an initial series of 8 patients to which similar techniques were employed. Through mini-incisions to the skin they were able to dry out a satisfactory length of vein, with a low rate of complications to the wound [5].

The improvement to those conditions that inhibit the recuperation of operated patients, thus optimizing their recuperation and avoiding possible postoperative complications, has guided researchers in the search for new techniques as well as their improvement. The final goal being therefore, that surgical intervention reaches a successful conclusion, which reflects upon the life quality of the patient.

The objective behind this study was to compare two types of incision for saphenectomy: conventional incision (7 cm to 10 cm) and mini-incision (3 cm to 4 cm) without the use of special materials in regards to the occurrence of complications to the saphenectomy surgical site, such as pain, edema, hematoma, dehiscence, necrosis, infection and seroma.

2. Method

Based on a randomized clinical trial of the types and evolution of saphenectomy incisions in patients that are submitted to coronary artery bypass surgery.

This study was designed to evaluate 66 patients that were submitted to cardio coronary artery bypass surgery, with prospective cardiopulmonary bypass. This number of patients was calculated taking into consideration a 30% complication rate for saphenectomy surgeries and 10% for minimally invasive surgeries and a power test of 90% and confidence at 95%.

The retrieved data were submitted to statistical treatment where the qualitative variables, such as pain, edema, hematoma, dehiscence, necrosis, infection and seroma, were analysed through the use of the Binomial Test between two portions.

The analysis of the quantitative variables was performed through use of the Shapiro Wilk test in order to check if the data possess normal distribution; those that had normal distribution the student's t-test was used for two independent samples, those which did not possess normal distribution were submitted to the Mann Whitney test.

Selected for the study was every patient registered at the CHUFU who was older than 18 and that had been submitted to only coronary artery bypass surgery, with the removal of the great saphenous vein through one of the proposed incisions. Patients excluded from this selection were those that had undergone other surgical methods besides coronary artery bypass and saphenectomy, such as: valve replacement, aneurysm repair, carotid endarterectomy; revascularization without the use of cardiopulmonary bypass (CPB) among others, also prolonged cardiopulmonary bypass (CPB) (>than 120 min).

The surgeries were performed during the period from January 2012 to August 2013. For randomization purposes, it was necessary that the patients, parents or guardians agreed and signed a patient consent form (PCF), after a full clarification had been given by a member of the team.

Once these criteria had been appropriately completed, the patient was selected and invited to participate in the study. After their acceptance, these patients were randomly placed into two groups: Group C (conventional incision) and Group M (mini-incision).

The random selection was performed through the medical record number prior to the beginning of the study and knowledge on the part of the surgeon as to the selected group was given only at the start of surgery. The patient therefore, had no idea of the saphenectomy technique that would be executed on the lower member.

In the conventional group, the incision performed on the lower

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