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EXCESSIVE BREAST SKIN NECROSIS AFTER SINGLE INTERNAL MAMMARY ARTERY HARVESTING

Running head: Breast Skin Necrosis After IMA Harvesting

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Abstract

There are still a lot of contradictory reports about single or bilateral, pedicled or skeletonized internal mammary artery (IMA) harvesting and its implication on sternal microcirculation and wound complications even in diabetic patients. We present the case of excessive breast skin necrosis after single IMA harvesting in a diabetic patient with necrosis progression far from the acute phase that finally has demanded for breast amputation.

Keywords

mediastinal infection, sternum, wound dehiscence, CABG, arterial grafts

Case report

We would like to present the case of a 48-year-old woman, M.B., admitted at the Department of Cardiac Surgery of our hospital on August 2nd 2006 after coronarography, which indicated myocardial revascularization (EF of the left ventricle was 40%, NYHA status III; EuroSCORE: 4). She suffered from insulin dependent diabetes for

15 years with polyneuropathy, polyangiopathy and nephropathy. From the beginning of 2005 she had symptoms of stable angina pectoris and in September 2005 she was hospitalized in another hospital for treatment of acute inferoposterior myocardial infarction. Revascularization was done in our hospital on August 4th 2006 using a single, pedicled left IMA for the left anterior descending artery (LAD) and a saphenous vein graft (SVG) for the posterior descending coronary artery (PD), in general anesthesia, hypothermia and assistance of extracorporeal circulation. On the first day after the procedure she became febrile with a following development of septic shock with renal failure and acute respiratory distress syndrome (ARDS). Hemoculture isolated Enterococci. During her stay in the Intensive Care Unit hemodynamic stabilization, targeted antibiotic treatment, tracheotomies (November 11th 2006), mechanical ventilation and hemodialysis because of renal insufficiency (19 procedures) have been done. On the 10th postoperative day the inotropic support was revoked and pleural and mediastinal drains were removed. On the 14th day she was disconnected from the mechanical ventilation

with spontaneous breathing. Wound culture isolated *Staphylococcus Aureus* and *Pseudomonas Aeruginosa*, in urinoculture *Escherichia Coli* and in bronchoaspirated material *Acinetobacter Baumannii* and *Candida Albicans*. The antibiotic treatment was corrected and the patient transferred to the Department of Cardiac Surgery on the 27th postoperative day. The cannula was removed on September 13th 2006.

A plastic surgeon was consulted on the 6th day after surgery, during her stay in the Intensive Care Unit, because of a small area of livid skin below areola of the left breast (2 x 3 cm), which was treated locally (Silver Sulfadiazine). We did not notice any other discoloration or contusion marks on the anterior thoracic wall skin. Because of the general condition and presumed acute phase of relative anterior hemithoracic ischemia after single IMA harvesting, the lividity was accepted as a transitory condition. A few days later, the local status was without noticeable progression and the treatment was the same. The next week visit discovered necrosis of the previously described area with small marginal progression, which was treated conservatively (Purilon gel and Biatain-Ag, Coloplast Ltd). Following consultations noticed further necrosis progression encompassing half of the total breast skin with extension to the sternal area (Figure 1a), which was treated with necrectomy and Biatain-Ag dressing (Figure 1b). Upon achieving a better local condition, on November 13th 2006, we covered the defect with split-thickness mesh skin graft (1:1,5) (Figure 1c) that resulted in total lysis of the graft and further progression of necrosis. With compensated general condition, she was transferred to the Department of Plastic Surgery on October 26th 2006. We decided, a few days later, to do radical debridement which resulted in partial skin sparing mastectomy of the left breast and a direct closure of the defect. On the next visit we noticed the wound dehiscence of the sternal region with further progression of the necrosis to the right inframammary fold (Figure 1d). We did the necrectomy again and applied the Negative Pressure Wound Therapy (V.A.C.® KCI) to the defect for one week to achieve clean granulation (2 days of continual and 5 days of intermittent suction, -125 mmHg) (Figure 2a). It was followed by split-thickness mesh skin graft (1:1,5) (Figure 2b) with V.A.C. fixation of the graft for three days (continual suction, -75 mmHg) that resulted in partial epithelization (more than two-

thirds) (Figure 2c). We continued with regular dressing on the ambulatory basis (Comfeel Plus Transparent, Coloplast Ltd) until total reepithelization was completed, which was noticed on January 30th 2007, 6 months after the initial procedure (Figure 2d).

Comment

According to some reports, even bilateral internal mammary artery usage has not been found as an independent risk factor for wound complication [1] and diabetes was not a cause of sternal ischaemia after IMA harvesting [2].

Earlier experimental animal studies of the sternal blood flow have reported significant devascularization of each hemi-sternum according to the corresponding IMA usage (more than 90% of its blood supply) [3].

More recent studies have made a distinction between pedicled and skeletonized IMA harvesting so the sternal microcirculation after pedicled harvesting has shown significant decrease of microcirculatory blood flow and retrosternal tissue oxygen saturation [4]. However, the parameters of microcirculation in the presternal area remained unchanged compared to the baseline values. Other studies have also shown acute postoperative sternal ischaemia for a pedicled IMA graft, but this does not occur when the IMA was skeletonized [5].

The metaanalysis of 106 papers has concluded that skeletonisation should be the technique of choice for diabetics in whom bilateral IMA harvest is desired, but no convincing outcome benefits have been shown for single IMA harvest [6]. Nevertheless, our case, although with a single IMA harvest, resulted in a dreadful necrosis progression.

The correlation of sternal ischaemia and IMA usage is more significant in the acute phase, within two weeks, because it resolves with time, presumably due to opening of collateral vessels [7]. In our case, the progression of necrosis has continued with time far from the acute phase.

We would like to emphasize this case of excessive breast skin necrosis with sternal extension not because of the mentioned treatment modalities, which could be of different preferences, but to stress the importance of meticulous "cost-benefit" estimation of even single IMA usage or preservation in patients with diabetes.



Figure legends

Figure 1a. Necrosis of half of the total breast skin with extension to the sternal area



Figure 1b. Status after necrectomy



Figure 1c. Defect covered with split-thickness mesh skin graft (1:1,5)



Figure 1d. Condition after partial skin sparing mastectomy of the left breast and direct closure of the defect - further progression of the necrosis to the right inframammary fold



Figure 2a. Status after repeated necrectomy and application of the Negative Pressure Wound Therapy (V.A.C.® KCI)



Figure 2b. Split-thickness mesh skin graft (1:1,5) (Figure 2b) with V.A.C. fixation of the graft for three days (continual suction, -75 mmHg)

Figure 2c. Partial epithelization (more than two-thirds)



Figure 2d. Total reepithelization 6 months after the initial procedure



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