Cosmetic aspects in minimally invasive cardiac surgery

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Abstract

The initial focus of the pioneering cardiac surgeons was appropriately centered on survival as opposed to cosmetic results. A variety of minimally invasive techniques have been introduced to perform cardiac operations through a limited incision. As the results in cardiac surgery improved, cosmetic and psychological implications of surgery become more important in the evaluation of the morbidity of these procedures. Future comparative studies will be mandatory to show whether these small incisions have an actual advantage on recovery or morbidity or whether their interest is entirely aesthetic.

Keywords: Minimally invasive cardiac surgery; Cosmetic

1. Introduction

Since the beginning of cardiac surgery, median sternotomy represented the standard approach to most cardiac operations and the initial focus of surgeons was appropriately centered on survival as opposed to aesthetics. As the results improved, cosmetic and psychological implications of surgery become more important in the evaluation of these procedures. Alternatives to median sternotomy have been developed in time to conceal the sequels of this invasive approach with its long midline scar [1-4]. Brutel et al. were the first to describe a bilateral transternal sub-mammarian incision in 1956 [1]. Hanlon et al. proposed a modified approach consisting in a bilateral sub-mammarian incision combined with a vertical sternotomy, after development of a superior flap to expose the suprasternal notch and an inferior flap extending beyond the xyphoid process [2]. More recently a variety of minimally invasive techniques have been introduced to perform cardiac operations through a limited incision, but sometimes, minimizing the incision implies maximizing technical difficulty. The use of video-thorascopic equipment and femoral-femoral cardiopulmonary bypass systems may provide the means to perform these techniques [5-11]. The use of these mini-invasive techniques in valvular surgery is based on an aesthetic interest. Future comparative studies will show whether these small incisions have an actual advantage on recovery or morbidity or whether their interest is entirely aesthetic.

In coronary surgery, it is the use or not of the CPB which defines the mini-invasive nature of the procedure. The size of the incision has less importance. However, the possibility of coronary bypass surgery without CPB and by mini-thoracotomy is certainly a less aggressive approach and has also a certain aesthetic interest. The evolution towards endoscopic and robotic techniques will bring us nearer this goal [12].

In congenital surgery, once the malformation is repaired and recovery completes, often all that remains is a non-aesthetic scar. Numerous approaches have been proposed such as the antero-lateral thoracotomies, partial sternotomies and postero-lateral thoracotomies [13]. Minor cardiac operations such as atrial septal defect or pulmonary stenosis, irrespective of their indications, were most often forgotten or repressed, especially by young people; therefore the skin scar has been quite often the long lasting reminder of the cardiac operation. The vertical skin incision may leave an unsightly scar, cosmetically unsatisfactory and a source of psychological displeasure modifying the patient’s body image [13]. The cosmetic effects of a midline thoracic scar might be expected to have a negative impact on patients’ self-concepts and therefore on their quality of life. Patients have essentially three different types of expectations before cardiac surgery: (1) the necessity for surgical repair of their disease and the hope for success; (2) the psychological stress; and (3) social (interpersonal) expectations. If the size and quality of the scar is related to the degree of the patient’s psychological distress, then this
factor should be taken into account in planning surgical procedures. Studies of the emotional or cognitive implications of scarring after cardiac surgery have been rare. The clinical experience of two hospitals in the field of minimally invasive cardiac surgery forms the basis of this work. The original techniques and the results of the first series of patients have already been reported [8,12,13]. Among the entire group of patients [13], we have investigated the cosmetic impact of cardiac surgery in a series of young female patients who underwent atrial septal defect closure through a right anterolateral thoracotomy.

2. Methods

From January 1976 to December 1993, 56 females underwent ASD closure through a right anterolateral thoracotomy approach. At the time of surgery the mean age was 21.5 years (range, 13–46 years) and the mean weight was 49 kg (range, 42–67 kg). This approach was preferred for cosmetic reasons in female patients presenting a completed breast’s development.

2.1. Surgical technique

Patient is placed in a 30° anterolateral position with the right arm positioned lateral to the chest; right groin is usually draped for potential femoral cannulation. The skin incision is made along the right infra mammary groove between the parasternal and midaxillary line; the line incision is marked previously with the patient in orthostatic position to be sure of the anatomic limits; the breast and pectoralis major muscle are dissected en bloc from the chest wall that is entered in the fourth intercostal space. Electrocautery is used with caution and limited to the sources of bleeding. The pericardium is then opened longitudinally 2 cm anterior to the phrenic nerve. Pericardial stay sutures are put on traction to elevate mediastinal structures in the operative field. Aortic cannulation was accomplished without problem in 44 cases and femoral cannulation was performed at the beginning of our experience in 12 cases. After bicaval cannulation, cardiopulmonary by-pass is instituted and maintained with mild hypothermia (32°C). For simple ASD and PAPVC (54 cases) we have used electrical fibrillation and for the two other cases aortic cross-clamping with cardioplegia has been required. The right atrium is opened using a standard oblique incision. The ASD was closed directly by two continuous mattress sutures or with a Dacron Patch, when it was necessary. The heart is defibrillated and the cardiopulmonary by-pass gradually discontinued. Pericardium was closed and one pleuro-pericardial drain was placed through the same skin incision in sub-mammary groove. The chest was then closed in a routine fashion with an intradermic continuous suture (4/0 absorbable material) for the skin layer.

The aesthetic evaluation was assessed objectively, by the physician, and subjectively by a multiple-choice questionnaire. During scheduled clinic visits, patients completed a self-report questionnaire that had been developed and pre-tested for this investigation. The questionnaire requested respondents’ opinions on the size and cosmetic implications of their scar. A part of the questionnaire’s multiple-choice items comprised a ‘cosmetic impact’ test. The breast volume, symmetry and the character of the scar were evaluated by the examiner’s eye; functional anomaly (trouble nursing, numbness, twinges of pain) was carefully researched to the anamnestic interview. Photographs (frontal and oblique views) of the patients were obtained with a Yashika FX 50-mm lens. The questionnaire focused the attention to the auto-evaluation of the aesthetic result and its psychological influences. A summary of the questions follows:

1. subjective impression regarding the volume and the symmetry of the breasts;
2. description of the quality (color, dimension and visibility) of the scar;
3. unhappy with the scar when: dressings are removed; appearance in a bathing suit; playing sport, buying bras; or during intimate relations with partners;
4. satisfaction or dissatisfaction resulting from the surgery.

### Table 1

<table>
<thead>
<tr>
<th>Perception of the scar (dimension, color, visibility)</th>
<th>OBJ. (%)</th>
<th>SUB. (%)</th>
</tr>
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<tbody>
<tr>
<td>Not</td>
<td>25.5</td>
<td>17.0</td>
</tr>
<tr>
<td>Slightly</td>
<td>63.8</td>
<td>68.0</td>
</tr>
<tr>
<td>Very</td>
<td>10.6</td>
<td>14.8</td>
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</table>

<table>
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<tr>
<th>Evaluation of cosmetic result</th>
<th>OBJ. (%)</th>
<th>SUB. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>80.8</td>
<td>70.2</td>
</tr>
<tr>
<td>Good</td>
<td>14.8</td>
<td>21.2</td>
</tr>
<tr>
<td>Mediocre</td>
<td>0</td>
<td>8.5</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Psychological influences</th>
<th>OBJ. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absence of troubles when:</td>
<td></td>
</tr>
<tr>
<td>Clothes are removed</td>
<td>87.0</td>
</tr>
<tr>
<td>Dressed in a bathing suit</td>
<td>80.6</td>
</tr>
<tr>
<td>Participating in a sport</td>
<td>90.3</td>
</tr>
<tr>
<td>Buying bras</td>
<td>90.3</td>
</tr>
<tr>
<td>Intimate with partner</td>
<td>93.5</td>
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psychological relapses resulting from the questionnaire are reported in Table 1.

4. Comment

The cosmetic effect of a cardiac operation is how the patient’s perception of himself has changed. Minimally invasive surgery may facilitate improvement in the patient’s psychological functioning primarily by modifying the patient’s body image.

The evaluation of expectations is important because expectations influence the patient’s perception of the surgical outcome. It is the patient’s perception of the surgical outcome that determines the ultimate psychological response to the results of the operation [14]. The concept of body image is important for understanding the psychological response to sequelae of surgery. The potentially important body image factors influencing the satisfaction include the patient’s subjective perception of the surgical change; patient expectations, social evaluation of surgical change and the patient’s age and gender. It is also important to understand the degree of relationship between body image and one’s self concept and self-esteem and the degree to which body image is influenced by external factors (body image variables). The psychological consequences of cardiac surgery have been rarely considered of interest. Not only may the patient’s psychological state affect post-operative morbidity and mortality, it is also an important index of recovery. Cardiac surgery is one of those life experiences that has extremely salient positive and negative aspects. On the positive side there is the promise of relief from disturbing symptoms, increased ability to function, or the promise of survival, and on the negative side there is the physical risk of surgery itself, the pain and the sequelae in the body image (scar). There is some evidence that patients that are prepared for cardiac surgery report less depression and anxiety after the operation relative to controls. Our work shows that in the mind of patients, the operation heals the cardiac pathology, but it marks definitively the body image: feelings of frustration result from buying bras and clothing, participating in sports and in family life. The short skin incision is better; but on the other hand, the limited extension of the scar, may lead to develop an attitude of denial of the experienced operation, magnifying the sense of aesthetic maim. This can enhance the criticism, by the patients, with regard to the aesthetic sequelae of the scar.

In conclusion, for decades, the consequences of surgical wound trauma and the final appearance of the surgical scar were of considerably lessened priority than the safe performance of the repair. Once surgeons perfected the surgical techniques, the challenge remained to reduce the impact of the cosmetic blemish which median sternotomy may leave on the patient’s chest.

References