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Median Sternotomy Scar Outcome: Our Experience

Srivastava DK*

Department of Cardiovascular and Thoracic Surgery, DR RML Institute of Medical Sciences, India

Research Article

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***Corresponding author:** Dharmendra Kumar Srivastava, Department of cardiovascular and thoracic surgery, DR RML Institute of Medical Sciences, Vibhuti Khand Gomtinagar, Lucknow, India; Email: drdks01@gmail.com

Abstract

In the modern era of cardiac surgery, median sternotomy is still gold standard approach to most of the surgical procedures because the main concern of surgeon and patients is safety without taking any risk. We have evaluated patients with mature scar who had median sternotomy at least one year previously. A database of patients with median sternotomy operated from May 2016 to April 2017 existed and every fourth patient was approached and invited to participate in the trial. The patients were evaluated in OPD. A total of 90 patients were approached out of which 60 participated in the study. Participants were assessed by the clinician and photography of the scar was done. Sternotomy scars were assessed using POSAS version 2.The POSAS is both patient and clinician based using a continuous scale. The patient component of the POSAS ranged from 6-52(maximum possible score of 60 for the worst scar) with a mean of 18.26. The total clinician scale score ranged from 6-44(maximum of 60) with an average of 17.52. This study shows that hypertrophic scarring can develop in 1 in 5 patients and 1 in 3 can present with poor healing. Future comparative studies will be needed to show whether surgical safety is utmost importance only or aesthetic value also include in scar assessment.

Keywords: Scar; Congenital; Surgical; Sternotomy

Introduction

Median sternotomy scar usually results from heart valve replacement, CABG and congenital heart surgeries .About scar it has been said that it represents an endpoint in wound healing. Actually it is a physiologic response to injured tissue and reflects the body's attempt to restore tissue strength and integrity. It is a dynamic process, beginning at the initial injury and proceeds temporarily through phases of wound healing to produce a mature scar.

Scar formation causes functional, aesthetic and emotional problems. A hypertrophic scar is persistently red, raised and sometimes itchy [1]. Presternal wounds have been reported to often scar poorly resulting in hypertrophic scar formation in comparison to scars formed in other anatomical locations.

Scar usually presents with pain, itching, discolouration and irregularity. These are assessed based on four variables: pigmentation, vascularity, pliability and height. There are different scar assessment scales [2]. In this study we have assessed different scar outcome of median

sternotomy using POSAS (patient and observer scar assessment scale) and photographs [3].

Method

We have evaluated patients with mature scar who had median sternotomy atleast one year previously. A database of patients with median sternotomy operated from may 2016 to april 2017 existed and every fourth patient was approached and invited to participate in the trial. The patients were evaluated in OPD. Patients with emergency sternotomy and history of re exploration following chest closure were excluded.

Sternotomy scars were assessed using POSAS version 2.The POSAS is both patient and clinician based using a continuous scale. The patient scale analyses variables such as pain, itch, colour, stiffness, thickness and scar irregularity. The observer scale of the POSAS consists of six items: vascularity, pigmentation, thickness, relief, pliability and surface area. All items are scored on scale ranging from 1(like normal skin) to 10(worst scar imaginable). The sum of the all variables scores patient as well as observer POSAS scale. Patients also had their scar photographed.

Results

A total of 90 patients were approached out of which 60 participated in the study. Participants were assessed by the clinician and photography of the scar was done.

Median age of the patient was 35.38 years and 100% were asian origin. 29(48.33%) were male and 31(51.66%) female. We found that female patients reported high rate of concern about their scar. The most common complaints was pruritus over scar (20%) while two (3.33%)were concerned with pain. Eighteen patients (30%) presented with poor scar healing and six (10%) were not satisfied with the cosmesis of the scar.

POSAS: Patient 18/60 Observer 14/60

POSAS: Patient 22/60 Observer 18/60

POSAS: Patient 48/60 Observer 41/60

POSAS: Patient 52/60 Observer 44/60

Figure 1: Patient and observer scoring of scars.

The clinician evaluated the vascularity, pigmentation, thickness, relief, pliability and surface area. In the study, 12 patients (20%) presented with hypertrophic scaring and 2 patients (3.33%) having postoperative complication with both having infection and 1 patient developed wound dehiscence.

The patient component of the POSAS ranged from 6-52(maximum possible score of 60 for the worst scar) with a mean of 18.26.The most common symptoms were itching and pain but patient did not score highly with average score of 3.26 and 2.11 respectively. The colour of the scar scored highest with average of 6.28.

The total clinician scale score ranged from 6-44(maximum of 60) with an average of 17.52.The highest scored variable was pigmentation with average of 5.21 followed by thickness with average of 4.68.

POSAS(observer)	Average(Range)
Vascularity(10)	2.51(1-5)
Pigmentation(10)	5.21(1-7)
Thickness(10)	4.68(1-8)
Relief(10)	4.11(1-7)
Pliability(10)	3.02(1-5)
Surface Area(10)	2.11(1-4)

Table 1: POSAS observer scale

POSAS(patient)	Average(Range)
Pain(10)	2.11(1-5)
Itch(10)	3.26(1-6)
Colour(10)	6.28(1-9)
Stiffness(10)	3.52(1-6)
Thickness(10)	5.11(1-7)
Irregularity(10)	4.21(1-7)

Table 2: POSAS patient scale.

Discussion

Hypertrophic scars are defined as pathologic scar that have not overgrown the original wound boundaries but are instead abnormally thickened and raised [4]. It has number of causes including genetic factor, increased wound tension, delayed wound healing and location of scar. In our study 12 patients (20%) presented with hypertrophic scar which is significant and only identified cause is location.

Sproat found that the reported frequency of hypertrophic scar formation from median sternotomy scarring was 30% in Caucasian and 50% in Asian populations [5].

Truong et al reviewed linear scarring in breast/chest wall and axillary wounds in women following breast surgery and although different scorring tools were used the scarring was poor in breast/chest wall scars compared with axillary scars. This support a predisposition to poorer scar formation across the chest wall rather other region [6].

Our study reveals eighteen patients (30%) presented with poor scar healing and six (10%) were not satisfied with the cosmesis of the scar. It is also observed that patients with midline sternotomy scar were more concern with symptoms like pruritus rather than appearance of the scar. This may be because of lower expectations and less overall concern about cosmesis with more interest in the functional benefit of the surgery especially in the group of males.

In the study it is also found that scar management is best approached by prevention rather than treatment. Prevention of scar may include techniques that change the natural history of scar maturation to minimise problematic scar formation. Techniques of wound closure in which wound edges sharply defined and aligned without tension heal with least amount of scarring. It may conclude approximating tissue with deep buried sub dermal stiches to minimise tension of overlying tissue before final apposition. Factors such as poor nutrition, diabetes, obesity and radiation exposure contribute to poor wound healing and infection contribute to poor scarring.

Conclusion

This study shows that hypertrophic scarring can develop in 1 in 5 patients and 1 in 3 can present with poor healing. Living with scar can be a challenege in a society that values physical attractiveness so it is important for a clinician to examine and provide proper preventive measures to ensure good scar outcome.

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