ORIGINAL ARTICLE

EARLY RESULTS OF 100 CASES OF MUSCLE SPARING MID AXILLARY VERTICAL THORACOTOMY

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ABSTRACTS

Objective: To analyze the surgical outcome of muscle sparing mid axillary vertical thoracotomy.

Methodology: Computerized clinical record of 100 cases of different chest pathologies in which muscle sparing mid axillary vertical thoracotomy was carried out at the Department of Cardiothoracic Surgery Unit, Post Graduate Medical Institute, Lady Reading Hospital Peshawar from January 2009 to December 2010 were retrospectively analyzed. Patients of all ages, both sexes and consenting to the procedure with diagnosis of hydatid Lung disease, Bullous Lung diseases, Clotted hemothorax, Foreign Body, Early Empyema, Recurrent pneumothorax, Solitary Pulmonary Nodule, Bronchiectasis and Diagnostic biopsy were included in this study. Patients with diagnosis of Fibro thorax, malignancies, Chronic Empyema, Indication for Emergency Thoracotomy and previous history of Thoracotomy were excluded from this study. Visual analogue scaling for pain was done in patients during stay at hospital where as evaluation of range of motion and cosmetic satisfaction done at one week follow-up.

Results: Out of 100 cases evacuation of clotted hemothorax was done in 22 (22%), Lobectomies 12 (12%), Decortications 17(17%), Hydatid Cystectomy 13(13%), removal of Foreign Body 5 (5%), Pleurectomy 10(10%), Bullectomy 5(5%), Wedge resection 10 (10%), Pneumonectomy 1 (1%) and Open Pleural Biopsy was done in 5 (5%) cases. Mean duration of surgery was less than 45 minutes and length of hospital stay was 3 days. Morbidity was 3 % including wound infection 2 cases and Post-Op Pneumothorax in 1 case. There was no mortality. According to visual analogue scale for pain 76% of patients were in 2-3 Visual Analog Scale on day 1, 80% on day 2 and 90% on day 3 before discharge. At one week follow up most of the patients (70%) showed good range of motion and 75% patients satisfied with good cosmesis.

Conclusion: Vertical Mid Axillary Muscle Sparing Thoracotomy incision provides acceptable access for most thoracic procedures, lesser operative time, decrease length of hospital stay, reduces post-operative pain, ensure good shoulder mobility and good cosmesis.

Key words: Muscle sparing, Mid Axillary, Vertical, Thoracic surgery.

INTRODUCTION:

Most frequent surgical procedure in thoracic surgery nowadays is still the standard muscle cutting posterolateral thoracotomy. Its major advantage is excellent exposure for a wide range of thoracic procedures. Main disadvantages are division of the major chest wall muscles and include severe post thoracotomy pain, ineffective coughing and poor performance of chest physiotherapy exercises, limited ipsilateral shoulder mobility, and delayed ambulation[1-6]. These increases postoperative morbidity. Seventy eight lung herniations were reported by Noirclerc et al in 1973[9,10] after doing standard posterolateral thoracotomy.

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Several modifications of the muscle sparing thoracotomy have been attempted. Many authors reported that muscle-sparing thoracotomy is an excellent alternative because of less postoperative pain and morbidity and better cosmetic results than the standard postero-lateral thoracotomy[11].The muscle-sparing thoracotomy was described by Bethencourt and Holmes in 1988 and does not involve transection of the major thoracic muscles, can be vertical or transverse incision starting at the base of the axillary hair line of approximately 6 cm in length.[12]

Muscle-sparing thoracotomy incision provides adequate exposure for most pulmonary procedures together with the aesthetic aspects of preserving rather than severing the lateral thoracic musculature. It provides more rapid recovery of lung function and shoulder mobility, less severe postoperative pain, quicker closure, a better seal, and undivided muscles, and may be used subsequently for a flap. Despite claims of benefit from this procedure, there has been little objective information to support these statements[13,14]. More so there are limitations to the muscle sparing thoracotomy being validated for a limited number of surgeries due to decreased surgical access. It has been recommended for surgical removal of Hydatid cysts, Decortication for empyema[15], sympathectomy[16], upper and middle lobectomies.[17,18,19]

The aim of our study is to analyze the surgical outcome of 100 cases of muscle sparing mid axillary vertical thoracotomy.

METHODOLOGY:

Computerized clinical record of 100 cases of different chest pathologies in which muscle sparing mid axillary vertical thoracotomy was carried out at the Department of Cardiothoracic Surgery Unit, Post Graduate Medical Institute, Lady Reading Hospital Peshawar from January 2009 to December 2010 were retrospectively analyzed. Patients of all ages, both sexes and consenting to the procedure with diagnosis of hydatid Lung disease, Bullous Lung diseases, Clotted hemothorax, Foreign Body, Early Empyema, Recurrent pneumothorax, Solitary Pulmonary Nodule, Bronchiectasis and Diagnostic biopsy were included in this study. Patients with diagnosis of Fibro thorax, malignancies, Chronic Empyema, Indication for Emergency Thoracotomy and previous history of Thoracotomy were excluded from this study. Visual analogue scaling for pain was done in patients during stay at hospital where as evaluation of range of motion and cosmetic satisfaction done at one week follow-up. Visual analogue scaling for pain was done in patients during stay at hospital where as evaluation of range of motion and cosmetic satisfaction done at one week follow-up.

Technique:

The patient is placed in a lateral decubitus position with the arm abducted and flexed slightly to minimize extensions of latissimus dorsi and serratus anterior. (Avoid the arm flexed at 90^0, or else the operative field is limited due to over-extension of latissimus dorsi and forwarding of scapula.) A vertical incision is made 5 cm length in the mid axillary line. The subcutaneous tissue and superficial fascia are developed in one layer to allow exposure of the anterior border of latissimus dorsi. To avoid seroma formation, it is necessary to minimize the dissection as much as possible. Latissimus dorsi is mobilized and retracted posteriorly. Retract anterior axillary fold anteriorly and posterior axillary fold posteriorly, divide intercostals muscle to enter pleural space. Tuffier retractor

is inserted perpendicularly, to retract latissimus dorsi and serratus anterior. There is no need to resect any ribs to achieve more exposure. After completion of the operative procedure, closure is very simple and quick. Chest tubes are inserted below the incision, the ribs are approximated with two absorbable pericostal sutures using polyglactin suture by the figure-of-eight method. Chest drain is needed, No inter-costal suture is needed. Closure is accomplished with re-approximation of subcutaneous tissue and superficial fascia in one layer by simple running suture. A pressure dressing is applied with fabric binder before changing position.

MEASUREMENTS:

The times from skin incision to the incision closure (operative time) were recorded.

Post operative pain measurements were according to the visual analogue scale 0-10. Assessment of the muscle strength was done on 7th post operative day using Medical research council (MRC) system and shoulder joint mobility by using a goniometer.

RESULTS:

Out of 100 cases, 68 were males and 32 were females age ranges from 6 months to 32 years with a mean age of 22 years. The surgical procedures included evacuation of clotted hemothorax in 22 (22%) cases, lobectomies 12 (12%), Decortications 17(17%), Hydatid Cystectomy 13(13%), removal of Foreign Body 5 (5%), Pleurectomy 10(10%), Bullectomy 5(5%), Wedge resection 10 (10%), Pneumonectomy 1 (1%) and Open Pleural Biopsy was done in 5 (5%) cases (Table I). Mean duration of surgery was less than 45 minutes and length of hospital stay was 3 days. Morbidity was 3 % including wound infection 2 (2%) cases and Post-Op Pneumothorax in 1 (1%) case. There was no mortality. According to visual analogue scale 76% of patients were in 2-3 Visual Analog Scale on day 1, 80% on day 2 and 90% on day 3 before discharge. (Table II). At one week follow up most of the patients (70%) showed good range of motion and satisfied with cosmesis (75%) (Table III, IV)

DISCUSSION:

The traditional posterolateral thoracotomy, which provides excellent exposure of the lung, pulmonary hilum, and mediastinum, has been the standard incision for pulmonary procedures for the past 90 years. However, disadvantages of this approach include the division of the major muscles of the chest, resulting in increased potential for blood loss, a moderate time requirement for opening and closing the incision, prolonged ipsilateral shoulder and arm dysfunction, scoliosis[1], compromised pulmonary function, and chronic post thoracotomy pain syndromes. The muscle-sparing thoracotomy was described by Bethencourt and Holmes[12] in 1988 and does not involve transection of the major thoracic muscles it has been advocated as a means of reducing postoperative pain, preserving pulmonary function, and lessening postoperative complications. It also involves the availability of extra thoracic musculature such as latissimus dorsi and serratus anterior for rotational flap control of postresectional space problems. In our study the major procedure was evacuation of the clotted hemothorax (22%) secondary to trauma as our unit is the only thoracic surgery unit in our province NWFP and we are running 24hr emergency .Trauma pts came to us directly as well as referred cases from periphery.

Thoracic Access:

The muscle-sparing thoracotomy provided acceptable access to the chest cavity for most pulmonary resections when required. Occasionally, its exposure may be difficult in heavily muscled and fatty individuals.

Operative Time:

The muscle-sparing thoracotomy is not a “chronophore” (time-eater). The total surgical time of muscle-sparing thoracotomy has been found to be less than one hour,

Postoperative Pain:

The other advantage of the muscle-sparing thoracotomy is the reduction in postoperative pain, as determined by the visual analogue assessment [11,13,14]. In some studies, the authors demonstrated no difference in postoperative narcotic requirements between both type of thoracotomy [12,15.] According to Lemmer and associates, this may be because most thoracotomy pain is not due to the effects of muscle transection but rather to those of costal retraction [7].In our study pain was assessed according to Visual Analog Scale showed 76% of patients were in 2-3 Visual Aanalogue Scale, 80% on day 2 and 90% on day 3 before discharge.

Range of Shoulder Motion:

Preservation of shoulder range of motion is significantly better when the muscle-sparing thoracotomy is performed than when the standard posterolateral approach is used[3, 5]. Whereas the range-of-motion returned to preoperative values of range by 2 weeks in muscle sparing thoracotomy, they returned to normal by 1 month in the standard posterolateral thoracotomy in our study. These results have been noted at 1 week after the operation but have not been significant at the 1-month assessment in a previous study [5.] Lemmer and associates reported that they did not measure postoperative mobility of the upper extremity on the operated-on side; it was their impression that functional disability was less in the muscle-sparing technique[15]. According to Hennington and associates, preservation of the latissimus and serratus muscles allows range of motion and function of the arm to return more readily[20.] In our study at one week follow up 70% of patient had shown normal range of motion and good cosmesis in 75% cases.

CONCLUSION:

Vertical axillary muscle sparing thoracotomy incision provides acceptable access for most thoracic procedures, lesser operative time, decrease length of hospital stay, reduces post-operative pain, good shoulder mobility, good cosmesis and decrease post-operative complications.

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Table I: THE PROCEDURES PERFORMED VIA MUSCLE SPARING APPROACH (N=100)

Procedure	No of patient's	Percentage%
Evacuation of clotted hemothorax	22	22%
Lobectomy	12	12%
Decortications	17	17%
Hydatid cystectomy of the lung	13	13%
Removal of foreign body	05	05%
Pleurectomy	10	10%
Bullectomy	05	05%
Wedge resection	10	10%
Pneumonectomy	01	01%
Open pleural biopsy	05	05%
TOTAL	100	

Table II: Visual Analogue Scale (N=100)

Post operative day	visual analogue scale	no of patients	%age
Day 1	0-1	00	
	2-3	76	76
	4-5	20	20
	6-7	04	04
	8-9	00	
	10	00	
Day 2	0-1	00	
	2-3	80	80
	4-5	20	20
	6-7	00	
	8-9	00	
	10	00	
Day 3	0-1	00	
	2-3	90	90
	4-5	10	10
	6-7	00	
	8-9	00	
	10	00	

VAS score

0 -1 – "very happy because he doesn't hurt at all."
2 - 3 – "hurts just a little bit."
4 - 5 – "hurts a little more."
6 - 7 – "hurts even more."
8 - 9 – "hurts a whole lot."
10 – "hurts as much as you can imagine, although you don't have to be crying to feel this bad."

Table III: RANGE OF MOTION ON OPERATIVE SIDE (N=100)

Varible	**No of patients**	**%age**
Flextion (0-180 degree)		
Normal	70	70%
Slight limitation (less than15 degree)	20	20%
Marked limitation (up To 30 Degree)	10	10%
Severe limitation (more than 30 degree)	00	
Abduction (0-180 degree)		
Normal	70	70%
Slight limitation (less than15 degree)	20	20%
Marked limitation(up To 30 Degree)	10	10%
Severe limitation(more than 30 degree)	00	

External rotation (0-90degree)	
Normal 70 %	70
Slight limitation (less than15 degree) 20 % Markrd limitation(up To 30 Degree) 10 %	20 10
Severe limitation(more than 30 degree)	00
Internal rotation rotation (0-90degree)	
Normal 70%	70
Slight limitation (less than15 degree) 20%	20
Marked limitation(up To 30 Degree) 10%	10
Severe limitation(more than 30 degree)	00

Table IV: COSMETIC SATISFACTION (N=100)

Cosmetic	No of patients	%age
Excellent	25	25%
Good	75	75%
Poor	00	00