LONG-TERM OUTCOME AFTER SURGICAL MANAGEMENT OF SYMPTOMATIC NON-UNION RIB FRACTURES

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Background

Traumatic chest wall injuries are common. Unhealed fractures cause feelings of instability, chronic pain, and discomfort. The surgical management of symptomatic non-union rib fractures could be beneficial in selected cases but there is a lack of long-term data.

Purpose

The aim of this study is to investigate the long-term outcome after surgical management of symptomatic non-union rib fractures.

Method

This is a cross-sectional study of patients (≥18 years) managed surgically for symptomatic non-union rib fractures 2010–2020 at Sahlgrenska University Hospital. Patients answered standardized questionnaires (yes/no) concerning remaining symptoms and satisfaction with surgery, Quality of life (QoL, EQ5D5L) and disability (Disability Rating Index, DRI, 0–100). Lung function, movement of the chest wall, thoracic spine (from C7 to 30 cm below) and shoulders (0–180°), and shoulder function (Boström index, 1–6) were assessed.

Results

Sixteen patients operated for symptomatic non-union rib fractures were included in this study, Median time of follow-up was 42 (23–69) months after surgery, which was performed 21 (4–161) months after injury. 94% of the patients were satisfied with the surgery, however 69% had remaining symptoms. QoL was decreased with median EQ-5D-5L index 0.819 (0.477–0.976) and median EQ-VAS 69 (10–100). Median DRI was 31.5 (1.3–76.7) with problems running, lifting heavy objects, and performing heavy work. Mean predicted lung function was decreased (Fig 1).

Table 1. Demographics of included patients operated for symptomatic non-union rib fractures (n=16)

Sex (M vs F)	12 vs 4
Age (mean±SD)	61.6±11.1
BMI (kg/m^2, median (range))	27.7 (24.2–40.3)
Smoking (n)	
No (n)	8
Yes (n)	3
Previous (n)	5
Lung disease (n)	6
MOI (Trauma vs Cough-induced)	10 vs 6
Injury	
Fractured ribs (mean±SD)	3.9±2.6
Flail Chest (n)	5
Diaphragm (n)	3
Lung hernia (n)	3
NISS (median (range))	12 (1–34)
Surgery performed	
Rib plate (n)	16
ZipFix® (n)	6
Mesh (n)	1
Diaphragmatic suture (n)	3

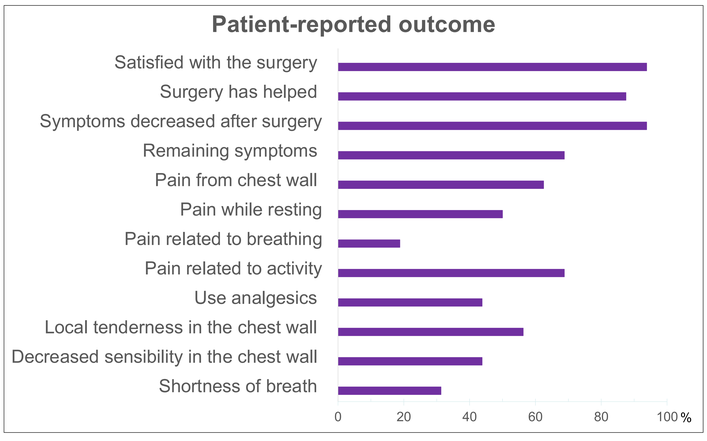

Figure 1. Patient answers to questionnaire (% with positive reply).

Table 2. Clinical outcomes in patients operated for symptomatic non-union rib fractures.

		All (n=15)	Trauma (n=10)	Cough-induced (n=5)	*P*-value
Lung Function (mean±SD)	%Pred FVC	86.2±14.2	89.5±13.1	79.6±15.4	0.215
	%Pred FEV1	79.1±10.7	80.1±9.3	77.2±14.1	0.639
	%Pred PEF	89.7±14.5	90.7±14.6	87.6±15.9	0.712
Range of motion in thorax (mm, mean±SD)	Upper (4th rib)	3.1±1.3	3.0±0.9	3.4±1.9	0.595
	Lower (xiphoid proc)	2.5±0.7	2.3±0.9	2.7±1.8	0.614
Movement thoracic spine (mm, mean±SD)	Flexion	2.0±0.7	2.2±0.6	1.8±1.0	0.400
	Extension	1.9±1.1	1.9±1.2	1.8±1.0	0.821
Movement shoulder on injured side	Abduction (0-180°)	166.1±12.0	158.3±31.4	180±0	0.072
	Extension (0-180°)	164.6±27.1	156.1±31.0	180±0	0.050
Shoulder function on injured side (Boström index, mean±SD)		5.7±0.6	5.6±0.7	5.9±0.1	0.159

CONCLUSIONS

Chest wall surgery for symptomatic non-union rib fractures results in decreased symptoms and patient satisfaction in most cases despite remaining symptoms, decreased lung function, chest wall movement, and QoL and persistent disability.

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