Peer review file

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Reviewer A

Comment 1: Invasive techniques for rib fractures and flail chest developed in parallel with the percutaneous techniques. One of the first publications in this area was from Hagen and Elkin (1-2). They describe a technique in which the depressed fractures are fixed with wires or sutures after open reduction. In spite of large number of methods introduced to stabilize the chest in order to fix the rib fractures no definitive solution has been presented yet (3). The pericostal suture is a long-forgotten treatment option, but it is not a new technique (4-6). Why did you choose this old surgical technique, why is suturing not a popular method?

Reply 1: Thank you for this important question. We introduced this concept based on our experience in pediatric chest stabilization, I personally used this technique at "Istituto dei Tumori Milano" in children. I personally think that many surgeons are afraid that sutures in general are not strong enough. With Maxon suture we have excellent experience and using our technique with multiple stitches as shown in the figures is very stable, no suture was breaking. Patients have less pain and can respire much easier and earlier.

Changes in the text: No changes.

Comment 2: Median lost lungs volume was only 5 % on the follow up CT-scan on seventh day. The authors performed three times in addition lung resection incl. one lobectomy. Were those patients from the volume experience excluded?

Reply 2: Those patients were excluded, thank you

Changes in the text: We have modified our text as advised (Page 8, Line 179).

Comment 3: Four patients had a postoperative complication. Most of the surgical manuscripts from the literature provide no details about any complications, but considering the proposed methods, we would expect them to lead to serious

complications like empyema, lung injury, cardiac injury, etc. The fact that none of these techniques have become widely popular confirms that probably all of these expected complications occurred. Please describe and comment your complications.
Reply 3: We observed 2 pneumonias that required antibiotic therapy. 2 patients underwent reoperation, one due to a intrathoracic bleeding and one because of acute cholecystitis.
Changes in the text: We have modified our text as advised (Page 8, Line 171-176).

Comment 4: Why did you choose the posterolateral-Shaw-Paulson-thoracotomy as standard? Why is a lateral thoracotomy without complete section the muscle serratus anterior not enough to present the dorsal rib fractures? All patients had dorsal rib fractures?
Reply 4: The posterolateral-Shaw-Paulson-thoracotomy gives and optimal overview of the whole hemithorax, seeing all potential lesions from the first to the 10^{th} rib and including the anterior fractures. Using the muscle sparing technique avoid to dissect any muscles is relatively atraumatic and maintains muscle functioning after operation.
Changes in the text: We add some data on tablee 1: see "side of trauma" fractures (anterior-lateral-posterior).

Comment 5: The authors wrote that the decision on the type of incision to be performed should be made on case-by-case basis; however, they performed always a Shaw and Paulson thoracotomy. Please comment.
Reply 5: Thank you for this advice, in fact we perform only Shaw Paulsen in approximately all cases with few exceptions.
Changes in the text: We deleted this part in the paper.

Comment 6: There is a lack of long term follow up (for example one year) of cases that were involved in the study. One patient had a nonunion. Please comment.
Reply 6: Patient hat a "nonunion" problem. Disappointingly, some of our patients

were tourists and were lost from long term follow up.
Changes in the text: No changes.

Comment 7: How many patients were excluded from the study and how they had been treated? Why was a diaphragm hernia an inclusion criterion?
Reply 7: No patients were excluded. Diaphragm hernia if a complex rupture of the diaphragm was obvious.
Changes in the text: We have modified our text as advised (Page 5, Line 95).

Reviewer B

As noted by the authors, surgical rib fixation is extremely important in critically ill patients with flail chest. The results from this project are hypothesis generating.

There are several issues which must be further described before consideration of publication of this manuscript may be considered:

Comment 1: Titan on line 44/174 should be changed to titanium.
Reply 1: Thanks for notice.
Changes in the text: We have modified our text as advised (Page 4, Line 81 and Page 10, Line 216).

Comment 2: Are figures 3 and 4 the same patient? It would be useful to show pre and post operative CT scan images of the same patient and same ribs.
Reply 2: It is the same patient.
Changes in the text: We have modified our text as advised (Page 15, Line 328).

Comment 3: Figure 1c, this appears to be full transection of the trapezius muscle not latissimus dorsi. Please clarify.
Reply 3: We described a modified Shaw-Paulson-thoracotomy approach because we perform routinely a complete mobilization of the trapezius and the latissimus dorsi muscle along the transverse processes of vertebral spine to rich the serratus (a classic

Shaw-Paulson-thoracotomy consist in a transection of the muscle trapezius body)
Changes in the text: We have modified our text as advised (Page 6, Line 125, 126 and Page 15, Line 313, 314).

Comment 4: Was IRB or ethics committee approval for the report obtained. Please specify.
Reply 4: The study was performed and approved in accordance to the local ethical guidelines.
Changes in the text: We have modified our text as advised (Page 11, Line 214).

Comment 5: What is the meaning of "section" in the procedure (Lines 87 – 94)? If this implies transection it does not meet the current implied meaning of muscle sparing thoracotomy.
Reply 5: Changed in the text, we wrote "mobilization"
Changes in the text: We have modified our text as advised (Page 6, Line 125, 126 and Page 15, Line 313, 314).

Comment 6: Where was the second drainage catheter placed? Line 99.
Reply 6: The second drain was placed between the chest wall and latissimus dorsi muscle.
Changes in the text: We have modified our text as advised (Page 7, Line 144, 145).

Comment 7: What happened to pain values with the reconstruction? Knowing about pain scores will aide surgeons in determining if they wish to try this approach.
Reply 7: All patients were tested after the operation with a daily VAS-Score
Changes in the text: We have modified our text as advised (Page 5, Line 105**;** we add some data on table 2 with VAS score at 2 th , 4th and 7th postoperative day.

Comment 8: Was there any sign of intercostal nerve entrapment postoperatively? Any neuropathic pain postoperatively? Did it resolve after the stitches dissolved?

Reply 8: We did not observe this complication.
Changes in the text: No changes.

Comment 9: Did any of the patients experience popping or clicking of their rib fractures post-operatively? Was this experienced in the non-union case?
Reply 9: We observed no plopping. The non-union case was resected 6 months after the trauma.
Changes in the text: we have modified our text as advised (Page 8, Line 179-180).

Comment 10: How was non-union diagnosed? Clinical, radiographic, or both?
Reply 10: It was diagnosed clinically because of pain and was confirmed with a CT scan.
Changes in the text: We have modified our text as advised (Page 8, Line 179, 181).

Comment 11: Much of the benefit of SSRF has been demonstrated with titanium plates. How do we know the same benefits will be seen with this type of fixation.
Reply 11: We cannot answer this question, this is our personal experience. Patients with metal stabilization have problems with local pain, infection, plate migration or dislocation. We agree that, a randomized controlled multicenter trial would be appropriate to answer this question.
Changes in the text: We have modified our text as advised (Page 10, Line 227).

Comment 12: This is one of the major weaknesses of this report. There is no control group to show this technique is as good as standard titanium plate fixation.
Reply 12: We agree to that; a randomized controlled multicenter trial would be appropriate.
Changes in the text: We have modified our text as advised (Page 10, Line 227).

Comment 13: The last line is confusing stating that the population is heterogeneous including trauma and neoplastic causes. The results show only trauma patients being

included. Please clarify.

Reply 13: We are sorry, we made a mistake in populations selection. We have homogenous population with only trauma patients.

Changes in the text: We deleted this part in the paper.

Comment 14: Figure 2 needs additional clarification. There is a big jump from c to d. it is unclear how this suture technique works.

Reply 14: The knot is always the same (2a-b-c) and its repeated at least three time in the same way before pulling and closing the fracture.

Changes in the text: we have modified our text as advised (Page 7, Line 138, 139 and Page 16, Line 319, 320). We change figure 2c.

Comment 15: This article points to a challenging issue in the care of injured patients. This article provides unique insight into this issue but limitations of the data should be further discussed as well as further analysis of the data. Thank you for submitting this article.

Reply 15: The limit of the study is the small patient number and that there is no control group. However, we observed encouraging results in our patients and we think that this technique should be considered in complex chest traumas**.**

Changes in the text: We have modified our text as advised (Page 10, Line 227).