Peer Review File
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Reviewer A

Comment 1:
The state in their conclusions that "Surgical rib fixation can be delayed without risk of pulmonary complication". This is quite a controversial statement and one not substantiated by the authors' work. The whole goal of surgical stabilization is to prevent respiratory complications. By limiting their analysis to just patient who underwent surgery, without non-surgical controls with similar injury burden the authors introduce considerable selection bias in their analysis. Yes, patients who were plated later appeared to have a similar number of respiratory complications as the ones plated earlier, but it is unclear if this is a chicken-egg phenomenon. Perhaps, the reason they were plated later is because their respiratory mechanics weren't suitable to enable an operation. I would encourage the authors to markedly temper their conclusions based on the analysis. At best, the authors can state that there was no association between earlier SSRF and respiratory complications, but even that is dubious based on the reported data.

Response: Thank you for your comment. As we aimed to analyze association between delay to surgical rib fixation and clinical outcomes, we focused on patient who underwent surgery.
We unfortunately cannot agree on the following statement "By limiting their analysis to just patient who underwent surgery, without non-surgical controls with similar injury burden the authors introduce considerable selection bias in their analysis."
Non-surgical controls would be interesting to incorporate in order to analyze benefits of surgical treatment compared to conservative treatment. Surgical rib fixation prevent respiratory complications compared to conservative treatment as shown in previous studies (1). Previous studies focused on the specific and interesting issue of comparison of late surgery versus conservative treatment (2).
This was not the objective of our study.
The main limitation of our study is the indication bias: how timing to surgical rib fixation was determined? Unfortunately, as it is a retrospective study, timing to surgery was bult

Changes in the text: we added a limitation paragraph to tone down our conclusion (see Discussion page 15 lines 828-838; page 15 lines 843-845).

Comment 2:
How did the authors choose their time cut-offs for early, mid and late? They cite Pieracci's 2018 paper, but in that paper an early (<24), mid (24-48) and late (>48 hr) cut off is advocated for. The authors' use a far less specific cut-off which likely influences their results and calls into question their findings.

Response: The time cut-offs for early, mid and late were quite hard to determine. We tried to used cut-offs comparable with previous studies. For the early group, Pieracci et al used a 24 hours cut-off (3) whereas other studies chose a 48 hours cut-off (2,4–6). To be as suitable to daily practice as possible (access to operating room) we chose 48 hours cut-off for the early group. For the latest group, some studies advocate a cut-off of 3 days (3,5), others 7 days (2,7). We chose those cut-offs to have 3 groups that fit with those previous studies.

Changes in the text: No changes in the text

Comment 3:
Abstract line 57: SSRF hasn't been rediscovered....the operation has become more common as techniques and technology have improved, but people have been performing this operation since the 1970s. The same comment holds true page 2 line 84.

Response: Thank your comment. You are totally right. The sentence has been changed.

Changes in the text: We modified our text as advised (see Abstract page 3 line 62-63)

Comment 4:
Abstract line 58: The authors are incorrect here. The EAST guidelines clearly acknowledge the potential benefit for SSRF in cases of flail chest. It is less clear with flail segments or >=3 rib fractures, but there are societal guidelines available here as well (CWIS being one...EAST is also coming out with updated guidelines).

Response: We agree with your relevant comment. Our sentence could be misleading. We changed it in order to focus on the objectives of the study.

Changes in the text: We modified our text as advised (see Abstract page 3 line 64-65)

Comment 5:
-Methods, page 6 line 106-108. It appears that the authors did not distinguish between a flail chest and a flail segment. This distinction is critical, as a flail chest (which is relatively rare) is considerably more morbid than a radiographic flail segment (which is relatively common). This is a major limitation of this manuscript.

Response: We think that your comment results in a tipping error in our sentence. We defined a severe thoracic trauma by three or more displaced rib fractures or a flail chest as defined per the taxonomy proposed by Edwards et al. Our definition was based on the such suggested taxonomy (8).

Changes in the text: We modified our text to be more accurate (see Methods page 5 line 308-309)

Comment 6:
-It is not clear that the authors are clearly reporting changes to their management patterns -> in the methods section, page 7 line 128 the authors state there was no change in how they did surgery. But then in the discussion, page 14 line 278/279 they describe how they changed their approach over time. Please clarify

Response: We did not change our surgical techniques over time. In the discussion part, we tried to report potential improvement in the technique, in general. Unfortunately, the meaning of our text is not clear. The sentence has been clarified.

Changes in the text: We modified our text to be more accurate (see Discussion page 14 line 714-715)

Comment 7:
-page 9, line 203-204: It appears the authors included two patients who had traumatic rib fractures after CPR after epidural placement. This is a VERY different population than patients with acute fractures who meet criteria up front, and should be excluded from analysis.

Response: We would like to apologize as the sentence seems to be unclear. Those two patients were hospitalized with traumatic rib fracture (respectively 5 and 7 rib fractures). Because of their medical condition, a conservative treatment was initially chosen. Epidural placement was performed for the pain management. At that time, they experienced cardiac arrest that needed CPR. Because of the CPR, rib fracture displacement increased. CPR did not induce traumatic rib fractures but worsened the displacement.

Changes in the text: We modified our text to be clearer (see Results page 10 line 546-547)

Comment 8:
Methods: was a power calculation performed to see if the number of patients the authors' had were enough to adequately determine significant difference in the outcomes the authors report?

Response: Thank you for your very relevant comment. It is challenging to perform a post-hoc power analysis to determine if a retrospective study is powered.
This approach can be misleading and do not indicate true power for detecting statistical significance and results are not sensible (9,10).
However, we understand that the power of our study can be questionable regarding the sample size. As underlined, we should be more careful with our conclusions. We added a more detailed limitation paragraph in the discussion method.

Changes in the text: No change

Comment 9:
-Discussion, page 4, line 294. The clinical benefit of SSRF is no longer questionable. Multiple systematic reviews have demonstrated clinical benefit for patients with flail chest, and those with flail segment or >=3 displaced rib fractures with evidence of physiologic compromise.

Response: You are completely right and we agree with you at 100%. The word “questionable” was not appropriate and results from a translation mistake. We changed the sentence was changed.

Changes in the text: We modified our text to be clearer (see Discussion page 15 line 822)

Reviewer B

Comment 1:
Please have an English native or fluent speaking person go through your manuscript to make it more readable and understandable.

Response: Thank you for your remark. The final version of the manuscript has been revised by an English native speaking physician.

Changes in the text: Many changes were done, for instance page 4 line 114 or page10 line 546.

Comment 2:
what is your actual primary endpoint? And secondary outcomes? Please also provide units to the outcomes (such as days for hospital length of stay)

Response: Our main clinical outcomes were defined as development of a pneumonia and extubation failure (need of reintubation within 48h after endotracheal tube or inability for the patient to trigger to sustain spontaneous breathing after changing the setup of the mechanical ventilation to continuous spontaneous ventilation mode). Secondary outcomes/endpoints were number of ventilation days after surgery, length of stay in ICU and in hospital in days, tracheostomy and mortality rate at 30 days after trauma.

Changes in the text: This paragraph can be found in Methods lines 471-487. As suggested, we added the units (see Table 2).

Comment 3:
The 10-year period is a great time window. However, the authors do not give enough insight into the specifics of the rib fracture program: for example, the information on the SSRF indications, SSRF technique, and algorithm is relatively scarce.

Response: We are very sorry if the SSRF indications did not look clear. We deleted figure 2 that was not accurate at all. We added the indications of SSRF the Methods section (major rib fracture displacement with chest wall deformation and/or ongoing pain and/or mobile flail chest and/or hemothorax >200mL/hour and/or suspicion of diaphragmatic laceration).
The surgical technique is described in the Method section (page 6 and 7 , lines 362 – 460). If you may specify the points of the SSRF technique you want us to describe, we would be pleased to complete the paragraph.

Changes in the text: We added some data (see Methods page 6 lines 360 – 362).

Comment 4:
My largest concern is that the provided data, while abundant, does not give us new insights. The biggest question that remains of importance is not answered: WHY do patients undergo early or late SSRF? Is it due to their associated injuries, pre-existing comorbidities, non-captured variables? Is it due to a shift in logistics, are we able to bring patients to the OR more quickly due to more insights into the possible benefit of SSRF?

Response: Thank you for your extremely relevant comment that underlines the difficulty to manage patients with associated injuries. The group were constituted retrospectively. The study suffers from indication bias: timing to SSRF was decided by
Surgical and medical team regarding subjects' clinical status at that time. We tried to take account of this indication bias performing analysis using un Directed Acyclic Graph.
Our findings suggest that timing to surgery might be less associated to clinical outcomes than thought, which differentiate from previous studies (11).
Your risen question about "why" patients undergo early of late SSRF could be the objective of a whole study. Our results suggest that associated injuries and their severity could be associated with timing to surgery as ISS and SAPS differs from the three groups (even if significance is not reached).

We worked on the discussion to highlight this particular issue.

Changes in the text: We added some information on the methodology and the limitations of the study (see page 8 lines 498 – 500; page 15 lines 829 – 834).

Comment 5:
This study is interesting as it is one of the few that shows that timing to surgery might be of less importance than is generally thought. However, what is currently needed is a prospective trial on this topic. A study that provides insight in the specific outcomes as well as the reasons why patients are designated to be operated on early or late(r).

Response: You are completely right. We underlined in the discussion the need of prospective studies in this field.

Changes in the text: We have our text modified as suggested (see Discussion page 15 ligne 839).

Comment 6 - Background.
The specific age of 52 is not relevant, suggest making this more general

Response: Thank you for your comment. The sentence has been changed in order to be more general.

Changes in the text: We modified our text as advised (see Background page 4 line 99).

Comment 7 - Background.
"Identified predictors of…" is missing a reference

Response: Thank you for spotting this. We rephrased the sentence and added appropriate references.

Changes in the text: We modified our text as suggested (see Background page 4 line 99, references 3-4)

Comment 8 - Background.
I recommend to use the term of surgical stabilization of rib fractures (SSRF) as this is most commonly used in general rib fracture literature over the last 5 years (instead of SRF or rib fixation)

Response: Thank you for the term, we changed it.

Changes in the text: We modified our text with the appropriate term SSRF (please see Background page 4 line 104, 111 etc)

Comment 9 - Background.
Please either provide a reference or adjust the sentence on "Surgical rib fixation (SRF) was first described…" as this is too broad. SSRF has only been described in small case series or reports before the 1980s-1990s but had never been implemented so could not have been "replaced" as you suggest. I do not believe this procedure has been rediscovered but rather "sparked an increased interest" or something alike as the mentioned studies in the 2000s were the first evidence based with some form of methodological value on SSRF.

Response: Thank you for your comment that show that our sentence is not readable. We meant that surgeons were more interested in SSRF from the 2000s than they were before. We would like to rephrase our sentence using the expression that you used.

Changes in the text: We modified our text with the suggested words (see Background page 4 line 106)

Comment 10 - Background.
What do you mean with "benefits on functional improvement", please specify.

Response: We mean "pulmonary function", this is a mistake in the translation.

Changes in the text: We modified our text in a clear way (see Background page 4, line 110).

Comment 11 - Background.
Rephrase "victims" to patients.

Response: Thank you for your comment, we rephrased.

Changes in the text: We modified our text as suggested (see Background page 4 line 112).

Comment 12 - Background
"the chest wall injury society has recently." this is a confusion sentence, please rephrase.

Response: Thank you for your comment, we rephrased.

Changes in the text: We modified our text to be more accurate (see Background page 4 line 115).

Comment 13 - Methods.
Please define "hypoxemia on pulse oximetry" in terms of saturation %.

Response: We added the definition of hypoxemia (<90% of saturation) in order to be more accurate as suggested

Changes in the text: We added some information (see Methods page 5 line 310).

Comment 14 – Methods
Provide definition of "STT" before writing it the first time.

Response: Thank you for noticing that mistake, we removed the term and rephrased (severe thoracic trauma).

Changes in the text: We changed the sentence (see Methods page 5 line 312).

Comment 15 – Methods
It is confusion whether you included all patients with 3 or more rib fractures AND a flail chest (text) or 3 or more rib fractures OR a flail chest (Figure 2)

Response: We think that your comment results in a tipping error in our sentence. We defined a severe thoracic trauma by three or more displaced rib fractures or a flail chest as defined per the taxonomy proposed by Edwards et al. Our definition was based on the such suggested taxonomy (8).

Changes in the text: We modified our text to be more accurate (see Methods page 5 line 308-309)

Comment 16 – Methods
Figure 2: please specify a clinical flail chest. Please define a clinical thoracic deformity. Please define surgical hemothorax.

Response: Thank you for your comment. The indications of SSRF were not clearly defined in our manuscript. We removed figure 2 which was not clear as underlined. We define indications for SSRF (chest wall deformation and/or ongoing pain and/or mobile flail chest and/or hemothorax >200mL/hour and/or suspicion of diaphragmatic laceration) and thoracic deformation (defined as the absence of symmetry of the chest wall after trauma on the X-ray).

Changes in the text: We added information in our text (see Method page 6 line 360-362; page 8 line 486-487)

Comment 17 – Methods
Figure 2 states that if you have 3 rib fractures (irrespective of displacement) and no possibility of epidural analgesia, SSRF was performed. Is this correct? You state in the Methods text that you could also place serratus or paravertebral blocks? What about intercostal blocks?

Response: Thank you for you very relevant comment on analgesia. Figure 2 was not clear at all and we removed it. SSRF was performed in case of uncontrolled pain despite optimal analgesia (including epidural analgesia or serratus or paravertebral blocks). For some patients, epidural was not possible (for instance because of vertebral fracture) and paravertebral blocks was performed.
We completely agree with you on the benefits of the intercostal blocks. We are not yet very familiar with this technique for patients with rib fractures. Some of the physicians in our team are learning this technique for these particular cases.

Changes in the text: Figure 2 was deleted and indication for SSRF are added in the text (see Method page 6 line 360-362).

Comment 18 – Methods
How did you define chest wall deformation as mentioned in the Results section?

Response: This rather subjective to define chest wall deformation. To our knowledge, we did not find any consensual definition in the literature. We defined chest wall deformation by the absence of symmetry of the chest wall after trauma. We added this definition in the section Methods.

Changes in the text: We added information in the text (see Methods page 8 line 482-484)

Comment 19 – Methods

How long were patients evaluated until pain was deemed uncontrollable despite optimal analgesia?

Response: Patients were evaluated every 2 hours for the first 48-72h. If pain deemed uncontrollable despite optimal analgesia, we performed SSRF.

Changes in the text: No change was made for this point

Comment 20 – Results
A first mention of "pneumopathy" is mentioned, was is meant by this? I have not previously heard about this outcome.

Response: This is a mistake in the translation. We meant pneumonia. We rephrased it.

Changes in the text: We changed the word pneumopathy for pneumia in the text (see Results page 11 line 582)

Comment 21 – Results
At what times were the materials removed in the three patients?

Response: The materials were removed respectively at 14, 12 and 25 months.

Changes in the text: No change was made.

Comment 22 – Results
What is meant by "re-intervention and adapted antibiotic use", this is interesting as there is little data on the exact treatment of infections after SSRF due to the low incidence.

Response: The patient encountered an empyema within the next days after SSRF. We performed a pleural decortication and antibiotics prescribed to treat staphylococcus aureus infection for 6 weeks.

Changes in the text: No change was made.

Comment 23 – Results
What surgical procedures were performed after 1 year? And what complications were encountered from the "prosthetic device"?

Response: The material was removed for four patients after one year: one patient suffered from chronic pain and was convinced that it was due to the material, two suffered from screw displacement and one from rib fracture three years later.

Changes in the text: We added more data (see Results page 12 line 624-626)

Comment 24 – Results
Provide statistical analyses and p-values to the characteristics in Table 1 between the three groups

Response: We added the p-value in Table 1.

Changes in the text: We added p-value in Table 1 (see Table 1)

Comment 25 – Results
How is it possible that patients with a median ISS of 32 have such short length of ventilation? Just curious, did they have such extensive extra-thoracic injuries?

Response: Actually, 49.1 % of the population had extra-thoracic injuries and their median ISS was 41. We added a description of extra-thoracic injuries in supplemental material 1. Patients without extra-thoracic injuries had a median ISS of 27.

Changes in the text: We added a supplemental material within more data (see supplemental material 1)

Reviewer C

Comment 1:
Blunt trauma usually induces many associated injuries. I suggested authors could add descriptions of associated injuries in all groups

Response: We agree with you; blunt trauma induces associated injuries most of the time. Some of associated injuries are described in Table 1 and we added a supplemental table with more information (supplemental material 1).

Changes in the text: We added a supplemental material within more data (see supplemental material 1)

Comment 2:
After blunt chest trauma, rates acute respiratory failures are not mentioned. The time periods of ventilator dependent after SSRF could be mentioned and compared in all groups

Response: You are right, this information is important. Table 1 shows the number of patient with spontaneous ventilation at admission. The time periods of ventilator dependent after SSRF is noted in table 2 ("LOV after SSRF in days").

Changes: See Tables 1 and 2

Comment 3:
Why patients are delayed to receive SSRF? The reasons could be described more in section of result.

Response: Thank you for your extremely relevant comment that underlines the difficulty to manage patients with associated injuries. The group were constituted retrospectively. The study suffers from indication bias: timing to SSRF was decided by
Surgical and medical team regarding subjects' clinical status at that time. We tried to take account of this indication bias performing analysis using un Directed Acyclic Graph.

Changes in the text: We added more information (see Methods page 8 line 495 – 497; Discussion page 15 line 829 – 831)

Comment 4:
The case numbers in late group are too small. Did the basic demographic characters in all groups have statistical differences or not?

Response: We added a paragraph about the limits of the study. No basic demographic differences were found in all groups.

Changes in the text: We added information in the discussion part (see page 15 line 827-829)

Reviewer D

This study is a retrospective design compares early and late ribs fixation.
About the patients, the abdominal lesion, orthopedic lesion and mobile flail chest rates are quite different. This may influence the outcomes.
The primary outcomes are pneumonia and failure of extubation. Not like most ribs fixation papers, the primary outcomes are usually pneumonia, days of ventilator use, lengths of ICU and hospital stay, and tracheostomy. The pneumonia rate is still higher at late group although the p value is not significant. The late group has the longest LOS hospital and the p value is 0.034. These need to be discussed.

Response: Thank you for your comment. The extra-thoracic lesions may influence the outcome for sure as they also influence the exposure (timing to SSRF). We considered this bias using a DAG to provide a multivariable model. Even if the pneumonia rate is higher in the late group, significance was not reach because of either a lack of power or potential confounders such as extra-thoracic lesions.

Our primary outcomes (pneumonia and failure of extubation) and secondary outcomes (number of ventilation days after surgery, length of stay in ICU and in hospital in days, tracheostomy and mortality rate at 30 days after trauma) are outcomes usually used in ribs fixation studies (1,4,7,11).

Length of stay in hospital is longest in the late group as by definition patients underwent surgery later.

Changes in the text: We added a paragraph in the discussion sections to highlight limitations of our study and to discuss the results (see Discussion page 15 lines 827 – 837)

Reviewer E

Comment 1:
Please clearly state the factors that led to surgery. I do not know exactly what factors determined early surgery, mid, and late surgery.

Response: Thank you for your extremely relevant comment that underlines the difficulty to manage patients with associated injuries. The group were constituted retrospectively. The study suffers from indication bias: timing to SSRF was decided by
Surgical and medical team regarding subjects' clinical status at that time. We tried to take account of this indication bias performing analysis using un Directed Acyclic Graph.

Changes in the text: We added more information in the text (see Methods page 6 line 357-359; Discussion page 15 line 829-833).

Comment 2:
A variety of fixtures are used in surgery on flail chests. Please also refer to this paper [Respirol Case Rep. 2022 Apr; 10(4): e0914.]. And please consider the types of fixtures.

Response: Thank you for your comment. We added a reference to this paper.

Changes in the text: We added more data in the text (see Discussion page 14 line 716 – 718; reference 41 - 42)

Comment 3:
Generally, the suction pressure of -20 mmHg suction is too high. Traumatic rib fractures are most likely to associate with traumatic pneumothorax, and high-pressure suction causes prolonged air leaks. Please indicate the reason why you are sucking at high pressure.

Optimal chest drainage method following pulmonary surgery is controversary and applied external suction has long been debated (12).
Some studies advocate to avoid external suction(13) while others found no difference in the incidence of prolonged air leak with or without applied external suction (14–17).
In our department, we use to apply an external suction of -20 mmHg suction, most of the time using digital chest drainage (18).

Changes in the text: No change

Reviewer F

Comment 1:
I would like to advise the authors to have their manuscript checked by a content expert native English speaker.

Response: Thank you for your remark. The final version of the manuscript has been revised by an English native speaking physician.

Changes in the text: English was corrected (see Discussion page 13 line 650; Results page 12 line 617; etc)

Comment 2 – Background:
Please check for typos, for example "blunt chest traumas = blunt chest trauma"

Response: Thank you for noticing those mistakes, we checked carefully the typos and made the necessary corrections.

Changes in the text: We made corrections in the text (see Background page 4 line 97; Title page 2 line 39)

Comment 3 – Background:
How does the introduction of rib specific implants have influenced the regained popularity of SSRF? Please comment.

Response: Your question is very interesting as popularity of SSRF increases. The introduction of rib specific implants and results from *Tanaka et al* and *Granetzny et al* studies might have influenced that.
Even though no clear consensus exists in the literature regarding absolute indications for SSRF, the procedure is quite popular.
The number of studies increased over the years from the 2000s (figure below). A wealth of medical devices is available for SSRF (plating and bicortical screws, absorbable plating, Judet struts, Kirschner wires and intramedullary pins) (19). This can reflect both the scientific and the commercial interests in SSRF.
The association of rib specific implants and the popularity of SSRF could be the object of an article by itself.

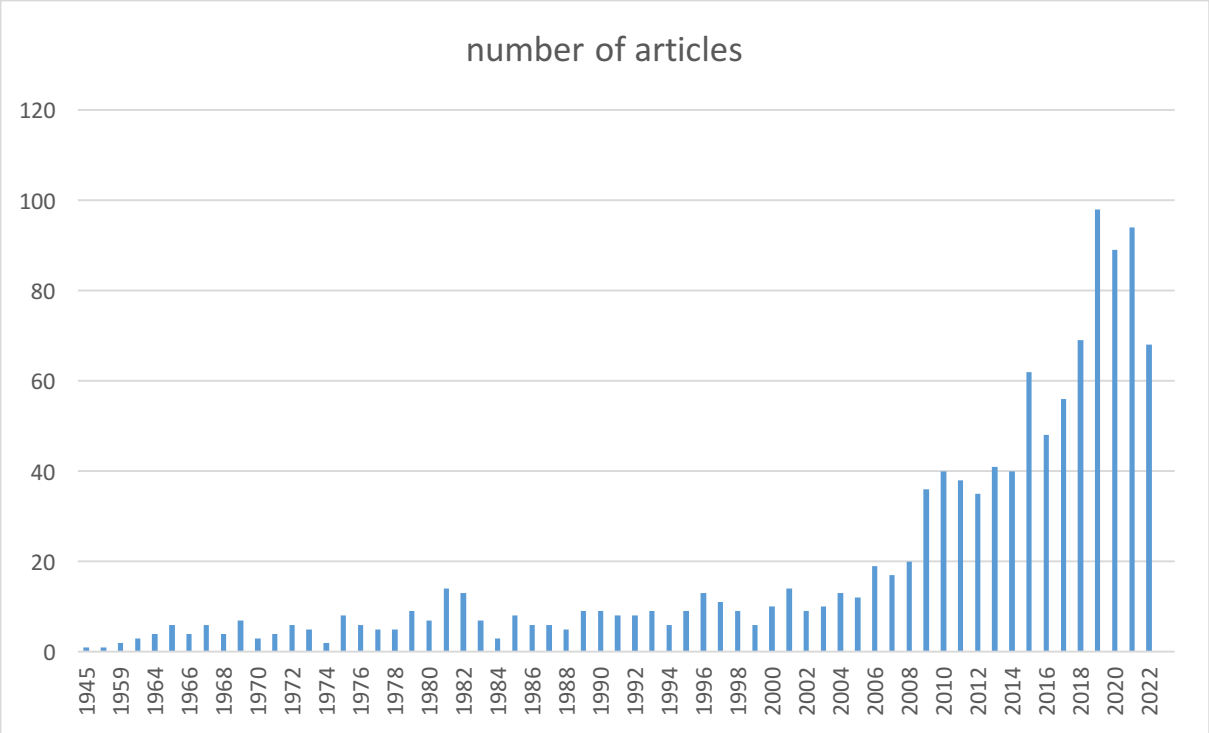

Figure 1. Number of articles in PubMed using keywords "surgical", "fixation", "rib".

Changes in the text: No change was made.

Comment 4 – Background:
Until now, there is only sufficient evidence and consensus to support SSRF for flail chest injuries; for multiple non-flail rib fractures, evidence is lacking. Please nuance your statement.

Response: This is a controversary topic and some studies underlines the clinical benefit of SSRF for appropriately selected patients with non-flail chest ribs fractures (20).

Changes in the text: No change was made.

Comment 5 – Background:
Chest Wall injury society: please use capitals (Chest Wall Injury Society, CWIS).
Done

Response: Thank you for advice. We changed that.

Changes in the text: We have modified our text as advised (see Background page 4 line 115)

Comment 6 – Background:
Regarding timing of SSRF in the last paragraph: in my opinion, this is highly dependent on clinical parameters and the indication for SSRF (ventilated patient with flail chest vs. failure of non-operative treatment of multiple non-flail rib fractures vs. elective non-union repair). Please elaborate.
How was timing of surgery determined?

Please elaborate on the indications and timing of the SSRF cases. How many SSRF's were performed for flail chest and non-flail chest injuries? What factors actually determined the timing of individual cases?

Response: Thank you for your extremely relevant comment that underlines the difficulty to manage patients with associated injuries. In our population, 121 patients had flail chest and 38 had non-flail chest injuries (table 1).
The groups were constituted retrospectively. The study suffers from indication bias: timing to SSRF was decided by surgical and medical team regarding subjects' clinical status at that time. We tried to take account of this indication bias performing analyses using un Directed Acyclic Graph (supplemental material 2).

Changes in the text: We added more information on group elaboration (see Methods page 8 line 495 – 497; Discussion page 15 line 829 – 831)

Comment 7 – Background:
Please add a reference to the sentence on STROBE guidelines

Response: We added a reference to the sentence on STROBE guidelines.

Changes in the text: We added the reference 15.

Comment 8 – Methods:
Please check English language, including singular / pleural and the use of capitals. For example, "of all the patients admitted to a Level 1 trauma centers".

Response: Thank you for your remark. We checked the English language and a native English speaker physician corrected our manuscript.

Changes in the text: We made many changes to improve the English language (for instance page 4 line 114 or page10 line 546)

Comment 9 – Methods:
In which level 1 trauma center was this study conducted? Please add.

Response: It was in Centre Hospitalo-Universitaire des Hospices Civiles de Lyon, France. We added the information.

Changes in the text: We modified the text as suggested (see Methods page 5 line 300)

Comment 10 – methods:
IRB approval: please add IRB name, number and approval datea

Response: We added the IRB approval information.

Changes in the text: We added the information (see Methods page 5 line 305)

Comment 11 – methods:
Severity of chest trauma: please use the accepted AIS / ISS definitions, including references.

Response. The AIS definition was used. We re-phrased the Method section.

Changes in the text: We added the information (see Methods page 5 line 307)

Comment 12 – methods:
Where all patients screened according to current ATLS guidelines?

Response: All the patients were screened according to current ATLS guidelines in a Level 1 trauma center.

Changes in the text: We added the information (see Methods page 6 line 346-347)

Comment 13 – methods:
STT: please refrain from non-accepted abbreviations

Response: This is a mistake. We changed that.

Changes in the text: We changed the sentence as suggested (see Methods page 5 line 312)

Comment 14 – methods:
Where total body CT-scans performed in all patients, or just in patients with >3 rib fractures on conventional radiography? This may introduce a significant bias, regarding the well know underestimation of injury severity on chest X-ray.

Response: Total body CT-scans were performed in all patients with chest trauma. We notified that in the Method section.

Changes in the text: Additional information was added to the text (see Methods page 5 line 312)

Comment 15 – methods:
Serratus: without capital

Response: Thank you, we changed that.

Changes in the text: We corrected the word (see Methods page 6 line 349)

Comment 16 – methods:
peep: positive end expiratory pressure (PEEP)

Response: Thank you, we changed that.

Changes in the text: We changed the sentence (see Methods page 6 line 351)

Comment 17 – methods:
injurie: injury

Response: Thank you, we changed that.

Changes in the text: The spelling was corrected (see Methods page 6 line 359)

Comment 18 – methods:
double lumen chest tube: double lumen endotracheal tube

Response: Thank you for the accurate term. We changed that.

Changes in the text: We have modified the text as suggested (see Methods page 6 line 367)

Comment 19 – methods:
phrenic reparation: incorrect English, I presume you mean repair of diaphragmatic tears or lacerations?

Response: You are right, we changed the word.

Changes in the text: We have modified the text as suggested (see Methods page 7 line 449)

Comment 20:
Why was suction applied to the chest tube?

Response: Optimal chest drainage method following pulmonary surgery is controversary and applied external suction has long been debated (12).
Some studies advocate to avoid external suction(13) while others found no difference in the incidence of prolonged air leak with or without applied external suction (14–17).
In our department, we use to apply an external suction of -20 mmHg suction, most of the time using digital chest drainage (18).

Changes in the text: No change was made

Comment 21:
please elaborate more extensively on the indications and your specific considerations to perform SSRF, since this is essential for the total context of the manuscript.

Response: Thank you for your comment. The indications were not clear in the previous version of the manuscript. The indications for SSRF were major rib fracture displacement with chest wall deformation and/or ongoing pain and/or mobile flail chest and/or hemothorax >200mL/hour and/or suspicion of diaphragmatic laceration.

Changes in the text: We added more information (see Methods page 6 line 357-359)

Comment 22:
How was chest wall deformation defined, since this is rather subjective?

Response: We agree this is rather subjective to define chest wall deformation. To our knowledge we did not find any consensual definition. In our center, chest wall deformation was defined by the absence of symmetry of the chest wall after trauma. We added this definition in the section Methods.

Changes in the text: We added the definition (see Methods page 8 line 484)

Comment 23:
What was the used definition of pneumonia?

Response: Pneumonia was defined with either fever or increased C-reactive protein with dense consolidation of entire lung or portion of a lobe (21).

Changes in the text: We added the definition (see Methods page 7 line 471-472)

Comment 24 – Results:
Please comment on the low percentage of patients with epidural or paravertebral analgesia?

Response: Finally, 67 patients were treated with epidural and 8 with paravertebral.
Unfortunately, some patients could not experience epidural or paravertebral analgesia (for instance, 28 patients had spinal fracture). Besides, some patients did not need epidural or paravertebral analgesia as they were not that painful (52 patients).

Changes in the text: No

Comment 25 – Results:
"Two patients experienced transient cardiac arrest secondary to extreme hypotension following epidural catheter placement. They were not initially eligible to surgery, but severe secondary fracture displacement following cardio-pulmonary resuscitation required SRF." Please rephrase, this paragraph is confusing and the secondary indication introduces bias.

Response: We would like to apologize as the paragraph seems to be unclear. Those two patients were hospitalized with traumatic rib fracture (respectively 5 and 7 rib fractures). Because of their medical condition, a conservative treatment was initially chosen. Epidural placement was performed for the pain management. At that time, they experienced cardiac arrest that needed CPR. Because of the CPR, rib fracture displacement increased. CPR did not induce traumatic rib fractures but worsened the displacement.

Changes in the text: We change the text (see Results page 10 line 543-546)

Comment 26 – Results:
Median ISS was 32 (IQR 25-43). Please elaborate on the significant number and etiology of associated injuries, especially because AIS and ISS for isolated severe chest injuries varies from 3-5 and 9-25 respectively. Moreover, how did the associated injuries influence the timing of SSRF?

Response: The associated injuries might influence on the timing of SSRF as patients might need critical care before being able to undergo SSRF. We used a DAG to reflect potential factors that might influence the timing to SSRF. We added a table with description of associated injuries in supplemental material 1.

Changes in the text: We added a supplemental material (see supplemental material 1)

Comment 27 – Results:
Regarding the 61% patients with uncontrolled pain: how many of these perceived uncontrolled pain despite epidural or paravertebral analgesia?

Response: Among them, 42 patients (43.0%) had uncontrolled pain despite epidural analgesia.

Changes in the text: no

Comment 30 – Results:
4 patients required another surgical procedure… due to complications induced by the prosthetic device. Please elaborate.

Response: The material was removed for four patients after one year: one patient suffered from chronic pain and was convinced that it was due to the material, two suffered from screw displacement and one from rib fracture three years later.

Comment 31 – Results:
Regarding the systematic use of VATS exploration: recent literature, e.g., Schots et al., Annals of Thoracic Surgery (2018) and Van Gool et al. (GTCS 2022) can be helpful to support your statement.

Response: Thank you very much for these interesting references.

Changes in the text: We added the references as suggested (see references 32-33)

Comment 32 – Results
Essentially, an extended limitations paragraph is missing. The current retrospective study describes a relatively low number of SSRF cases over a relatively long period. Clear indications for SSRF and its timing are lacking, inherently introducing substantial bias. Moreover, the conclusion that time to surgery for SRF is not related to clinical outcomes must be toned down.

Response: We totally agree with you. A paragraph on the limitation of the study was necessary and was added to tone down our results.

Changes in the text: We added an extended limitations paragraph as advised (see Discussion page 15 lines 828-845

Reviewer G

Comment 1:
There is no mention of Factors/Variables which determined the group that patients were allocated to?(Early, mid or Late)

Response: The group were constituted retrospectively. The study suffers from indication bias: timing to SSRF was decided by
Surgical and medical team regarding subjects' clinical status at that time. We tried to take account of this indication bias performing analysis using un Directed Acyclic Graph.

Changes in the text: We added more information on group elaboration (see Methods page 8 line 495 – 497; Discussion page 15 line 829 – 831)

Comment 2:
Furthermore, the selection for SSRF is confusing to read, for example, line 111 says 'all life threatening or haemorrhagic lesions were treated before SSRF. Selection criteria to SSRF were described in figure 2'. Figure 2 then says '> 1 lobe lung contusion at admission, despite of SSRF indication' and 'worsening status after 48 hrs or mechanical ventilation without pneumonia' are indications for conservative management rather than SSRF. What does worsening status mean? Is that respiratory status or overall? Does this mean they waited for evidence of pneumonia in mechanically ventilated patients before doing SSRF? If so this would affect the primary outcomes.

Response: Thank you for your comment. Figure 2 is not clear at all and was removed from the paper. Selection for SSRF was noticed in the Method part and reflected the clinical management of the patiens.

Changes in the text: We added some data (see Methods page 6 lines 360 – 362).

Comment 3:
Similarly, there is no definition of how the authors determined pneumonia Vs lung contusion Vs aspiration V collapse in the primary outcome. This makes comparison between the groups very difficult.

Response: We defined pneumonia as either fever or increased C-reactive protein with dense consolidation of entire lung or portion of a lobe (21). Lung contusion was notified according to radiologist's conclusion with the CT.

Changes in the text: We added the definition of pneumonia (see Methods page 7 line 471-472)

Comment 4 – Methods:
Line number 113, All patients were referred to ICU, there is no data on time of injury to presentation in ICU/Unit?

Response: Unfortunately, we did not have the data on time of injury to presentation in ICU. The maximum delay should a couple of hours as patients were directly admitted to ICU after their trauma.

Changes in the text: No

Comment 5 – Methods:
Line number 114, optimal pain relief was achieved, almost 72 patients were finally on ventilatory support, how did the authors measure pain relief on patients requiring ventilatory support?

Response: Thank you for your interesting point.The anesthesiologist and physician of the ICU unit used special scales to measure pain relief on patients requiring ventilatory support (22,23).

Change in the text: No

Comment 6 – Methods:
Line 120 describes only chest x ray for sepsis pulmonary complications, not sure how was it defined? There was no mention of blood cultures to define sepsis.

Response: This was a mistake in the translation. Thank you for noticing that. We re-phrased to define pneumonia.

Changes in the text: We added the definition of pneumonia (see Methods page 7 line 471-472)

Comment 7:
Line 232- Pnuemopathy- Definition
pneumonia

Response: This is a mistake in the translation. We meant pneumonia. We rephrased it.

Changes in the text: We change the word pneumopathy for pneumonia (see Discussion page 14 line 728)

Comment 8:
Line 234- ARDS -Definition

Response: We meant Acute Respiratory Distress Syndrom (ARDS)

Changes in the text: We removed the abbreviations (see Methods page 4 line 103)

Comment 9 – Results
Line 187- Sep 2010 to Jan 2020 makes it more than 10 years for the study period

Response: You are right, it is a 9 years and 4 months period that we rounded up to 10.

Changes in the text: no

Comment 10 – Results:
Line 201- no mention of timing for loco regional pain relief from time of surgery to injury/time to admission
Pain management in methods is a potential confounder. The pain management of these patients was mainly an epidural block, which was achieved in only 32.7% of patients [with 2 patients having transient cardiac arrests post epidural with CPR associated injuries requiring SSRF]. Two patients had para vertebral catheter. Would a higher rate of regional blocks affect the incidence of pulmonary complications and failure of extubation?

Response: Thank you for your very relevant comment. Pain relief Pain is a potential confounder explored by the DAG. As a result, it's a covariate of the multivariable analysis with variables set found with the DAG
Changes in the text: No

Comment 11 – Results:
Line 202 - line should read, not considered for surgery rather than eligible

Response: Thank you for your comment, we changed that.

Changes in the text: The text has been changed (see Methods, page 10 line 544-546)

Comment 12 – Results:
Line 242- Wound Infection, whether in Early, mid, or late group?

Response: One patient was in early group, 2 were in mid group and 1 in late group.

Changes in the text: No

Comment 13 – Results:
Line 244- Hardware removal which group?

Response: Among the four patients who required material removal, two were in early group, one in mid group and 1 in late group.

Changes in the text: No

Comment 14 – Results:
LINE 231 contradicts, 246, if patients median length after SSRF was 0 days why were they in ICU for 18.5 days

Response: Sorry for the misunderstanding. The number of 18.5 days was not for the ICU stay but for the length of stay in hospital. We rephrased to be clearer.

Changes in the text: We rephrased the paragraph (see results page 12 line 622 – 623)

Comment 15 – Results:
Line 297, 298- JTACS has two publications 2022 and 2021 specifically looking into long term benefit and 12 months device related complications.

Response: Thank you for those references. We added them in our discussion section on long-term benefits of SSRF.

Changes in the text: We added the references (see references 49-50)

Comment 16 – Results:
Line 292- EQ-5D has no mention in the methodology section, with no reference to duration of follow up from surgery? Does this questionnaire also` include those patients whose hardware was removed?

Response: We did not analyze EQ-5D. These are the result of other studies in the literature. We rephrased.

Changes in the text: We modified the text (see Discussion page 15 line 825)

Comment 17 – Results
Line 299-10% rate of removal in which group was this more frequent? There is no reference to 2019, 2021 publications from JTACS

Response: The 10% rate of removal was not in our population but from a previous study (Beks et al.)

Changes in the text: We rephrased the sentence (see Discussion page 15 line 825) and added references from JTACS (references 28, 44, 49, 50)

Comment 18 – Results:
Table 1 What about the elderly, the group of patients offered surgery are below age 70?
Response: Of the 159 patients of our population, 35 (22.0%) were >70 years old. The oldest was 85.
We did not focus on the elderly as previous studies highlighted the particularity of this population (24,25)
Changes in the text: No

Comment 19 – Results
No mention of BMI, were there any patients with higher BMI, as obesity leads to increased days to operation, increased length of operation, mechanically longer ventilation, longer stay in the intensive care unit (ICU) and hospital, and an increased risk of developing pneumonia. JCTT 2020.

Response: You underlined a very relevant point. We unfortunately were not able to collect the accurate weight and height for all patients as they were admitted in an emergency situation. For some patients we only had approximated values at admission. We were not comfortable with

the use of approximated values in our models. As obesity affects associated injuries (26), the effect of obesity in our results is caught by other covariables (i.e. lung contusion)

Changes in the text: We added BMI as one of the non-captured variables that could influence our results (see Discussion page 15 line 837).

Reviewer H

Comment 1:
"A real-life experience of the acute phase" is not a commonly used phrase in English. A more common subtitle of this type of paper is "A single-institution clinical experience"

Response: Thank you for your suggestion. We rephrased

Changes in the text: we modified the title as advised.

Comment 2:
"Identified predictors of mortality are age >80, Glasgow Coma Scale (GCS), male gender, injury severity score (ISS) and presence of lung contusion"
This should have a reference. I am not aware of any strong evidence that "Male Gender" is recognized risk factor for mortality from this type of injury. Please delete or provide references

Response: Our sentence was inaccurate. We rephrased and provided references.

Changes in the text: we modified the text as suggested (see Background page 4 line 99-100; reference 3-4)

Comment 3:
" then largely replaced by internal stabilization using mechanical ventilation. Surgical Rib Fixation for chest wall traumas was underwent a renaissance in the 2000's"
It was not entirely forgotten, at least two companies still made implants specific for rib fractures and these were being done sporadically by thoracic surgeons around the world. But it was not the standard of care for most cases

Response: You are completely right. We rephrased to underline the gain of popularity of SSRF since 2000s.

Changes in the text: we modified the text as advised (see Background page 4 line 106)

Comment 4:
SRF is still considered to be controversial by the vast majority of thoracic surgeons
I don't think this statement of "a vast majority" is accurate. The only survey of this I have seen was published by Mayberry et al. in 2009, in which 71% of thoracic surgeons agreed that there was a need for SRF in some scenarios, but there was a lack of consensus on the indications. I believe this has shifted considerably in the last decade, however, globally.

Response: Thank you for your comment, we agree with and toned down our sentence.

Changes in the text: we rephrased as suggested (see Background page 4 line 113)

Comment 5:
"attitude is : mainly secondary to a lack of consensus of surgical indications."
I think this is a more nuanced and accurate statement, if you agree. I would also read and cite the paper by Mayberry (J Trauma, 2009- I added it at the bottom of the references list)

Response: Thank you very much for this interesting reference.

Changes in the text: We rephrased as suggested and added this relevant reference (see Background page 4 line 113-114; reference 13).

Comment 6:
Severe thoracic trauma was defined by 3 or more rib fractures and flail chest
Did you mean "or flail chest"? Most authors agree that three or more displaced rib fractures constitute a severe chest wall injury. As per the taxonomy proposed by Edwards et al.

Response: We think that your comment results in a tipping error in our sentence. We defined a severe thoracic trauma by three or more displaced rib fractures or a flail chest as defined per the taxonomy proposed by Edwards et al. Our definition was based on the such suggested taxonomy (8).

Changes in the text: we have modified the text (see Methods page 5 line 308).

Comment 7:
"A daily Chest X-ray was performed to screen for rib fracture displacement and septic pulmonary complications."
I would leave it open, not just septic complications were screened, I am sure. Also "Septic" in English means systemic infection and a global inflammatory response

Response: This is a mistake in the translation. We rephrased in order to be clearer.

Changes in the text: we modified the text (see Methods page 6 line 354)

Comment 8:
"Among them, bony fractures including the upper and lower belt were found in 48 (61.5%) patients"
Please explain the term "belt". I am not sure what this may refer to. Is this upper and lower extremities?

Response: We misused the word "belt". We meant the extremities.

Changes in the text: we changed the text as advised (see Results page 11 line 564-565)

Comment 9:
"A pneumopathy was encountered in 67 (42.2%) patients and, most of the time, was diagnosed within <5 days after trauma (N=40; 59.7% of the pneumonias)."
"pneumopathy" is not a commonly used term in English literature. I would consider explaining what you mean by that (pneumonia, empyema, PE, etc.)

Response: This is a mistake in the translation. We meant pneumonia. We rephrased it.

Changes in the text: we changed the word pneumopathy for pneumonia (see Results page 11 line 583)

Comment 10:

We referred to surgery patients with 1- need of urgent thoracotomy; 2- Evident clinical or CT-Scan chest wall deformation; 3- presence of a paradoxical ventilation with respiratory insufficiency and 4- failure of an adequate analgesia management complicated by caught efforts inefficacy and bronchial congestion

Please reword this term (caught efforts inefficacy), it does not correspond to any English medical term I can think of.

Response: It was a mistake, we meant “ineffective cough”.

Changes in the text: we rephrased to be clearer (see Discussion page 13 line 649-650)

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