Authors' response to reviews

**Title:** Predicting outcome of rethoracotomy for suspected pericardial tamponade following cardio-thoracic surgery in the intensive care unit.

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To the editor of J Cardiothor Surg

Dear editor,

Thank you for reviewing our manuscript “Predicting outcome of rethoracotomy for suspected pericardial tamponade following cardio-thoracic surgery in the intensive care unit”, written by Ten Tusscher et al. and submitted to your journal for possible publication. We have revised the paper according to the useful suggestions made by the reviewer and enclose a marked copy of that. Below we give a point to point answer to questions, in defence of manuscript alterations (or not).

Thank you for considering our paper for publication,

Sincerely yours

On behalf of the authors.

Birkitt ten Tusscher.

Dear reviewer,

Thank you for comments. We would like to address your comments in this letter.

Comment 1: In the abstract 21 patients are mentioned, in Data collection 19 and 17 are reported.

Answer: We studied 21 patients who underwent rethoracotomy for suspected tamponade. Only in 19 patients echocardiography was performed. One patient arrested and went straight to the operating room and the other patient was also unstable and a decision for rethoracotomy was made without performing and echocardiography. Of these 19 echocardiographies 17 were performed transoesophageally and two transthoracally (see page 5 and 9).

Comment 2: No mentioning of urine output. Please comment on the limited value of monitoring urine production.

Answer: We studied patients suspected for tamponade after cardiothoracic surgery. The suspicion was based on clinical, hemodynamic, echographic or laboratory parameters. We compared patients with and without hemodynamic improvement after rethoracotomy. Diuresis could not distinguish between these groups (median urine output was low in both groups). If we would make a comparison with patients with an unremarkable postoperative course we might find a difference in urine output, but this comparison was not our current study objective.

3- Comment on use of heparin in postoperative phase.

Answer: Indications for heparin treatment postoperatively were mitral valve replacement, continuous venovenous hemofiltration, atrial fibrillation and high suspicion of pulmonary embolism on
CT scan (patient 17). Only in the case of mitral valve replacement heparin treatment, postoperatively, is standard policy if there are no bleeding complications and chest tube bleeding has stopped, heparin is then started the evening after surgery or on the first day postoperative. For all other indications heparin was started day 3 or later in the postoperative course.

4-Comment on a long duration of rethoracotomy after primary surgery.

**Answer**

Rethoracotomy was performed because of suspected pericardial tamponade, 1 to 16 (median 3) days after primary cardiothoracic surgery. Post cardiothoracic surgery tamponade can be divided in an early and late form possibly having different etiologies, with regional obstruction more commonly in the former and circumferential effusion more frequently encountered in the latter. We included all patients who underwent rethoracotomy for suspected tamponade after cardio-thoracic surgery to avoid this relatively arbitrary subdivision.

Studies not restricted to early pericardial tamponade report similar durations. Bommer et al. (Am Heart J 1995) studied patients who underwent pericardiocentesis or surgical evacuation of pericardial blood and clot after cardiothoracic surgery identified 14 patients with cardiac tamponade. They report a length of time from initial operation to relief of pericardial tamponade of 3 to 11 days. Kuvin et al report a median time to rethoracotomy for pericardial tamponade after cardiothoracic surgery of 10 days (± 1).

5-Comment on renal replacement therapy, when started

**Anwer**

One patient (patient 5) was on renal replacement therapy for chronic renal insufficiency before the primary surgery. Continuous venovenous hemofiltration (CVVH) was started 11 hours after primary surgery and continued until rethoracotomy. Patient 3 started with CVVH on day 3, rethoracotomy was performed on day 14. Patient 7 started CVVH on day 13, rethoracotomy was performed on day 14. So, both patients with new renal replacement therapy started before rethoracotomy.

6-Could a more advanced statistical procedure, like multiple variant analysis identify more factors (such as low urine output)

**Anwer**

We did not do multivariate statistics because of the small numbers involved. Moreover, univariate predictors (rather than independent variables for epidemiological evaluation found in multivariable analyses) may still be useful from a clinical point of view.

Comment: was TEE performed liberal and at what time?

**Anwer**

Transoesophageal echocardiography is performed on indication. Outside office hours an experienced cardiologist is on call to perform these examinations. Fourteen echocardiographies were recorded and therefore we were able to retrieve the exact time. 5 were performed outside office hours of which four of them during the night. Of the 14 retrieved echocardiographies 5 were performed within 24 hours from the end of surgery.

8-Comment: amount PE was quite high 500 resp 800 ml
The volume of pericardial fluid recovered at rethoracotomy (in n=9 patients) amounted to 500 (350-1000) mL in patients with unchanged CV SOFA and 800 (600-1700) mL in patients with a decrease in CV SOFA after rethoracotomy (P=0.09). page 10

**Anwer**

The relatively high amount of pericardial effusion is based on operation charts of 9 patients, so it is not an estimated but a measured amount. This amount can however be influenced by active bleeding. Because of the retrospective nature of this study we can not exclude this.

However other studies found similar amounts:

Pepi found in 15 patients with tamponade after cardiothoracic surgery a mean amount of pericardial fluid removed of 738 ml (range 270-1500ml) (Br Heart J 1994). Chuttani (Am Heart J 1994) studied patients with postoperative tamponade, in two patient no amount was noted, the mean amount of the other 27 patients was 760 ml (range 50-1495 ml).

Russo (Chest 1993) found in 10 patients with postoperative tamponade a mean amount of fluid drained of 525 ml (range 100-1200ml).

So these studies report amounts of pericardial fluid drainage compatible with our study.

I hope I could satisfactory address your comments.

Sincerely yours

On behalf of the authors.

Birkitt ten Tusscher