Best evidence topic - Cardiac general

Does the use of topical tranexamic acid in cardiac surgery reduce the incidence of post-operative mediastinal bleeding?

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Summary

A best evidence topic in cardiac surgery was written according to a structured protocol. The question addressed was whether the use of topical tranexamic acid reduces the incidence of post-operative mediastinal bleeding. Altogether 511 papers were identified using the below mentioned search, of which only one paper presented the best evidence to answer the clinical question. The author, journal, date and country of publication, patient group studied, study type, relevant outcomes, results, and study weaknesses of the paper are tabulated. We conclude that, only 1 RCT exists to answer this question, which demonstrated a clinically small benefit in favour of topical tranexamic acid in low risk patients. Further RCTs should be performed prior to any further use of topical tranexamic acid as a strategy to reduce post-operative bleeding.

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1. Introduction

A best evidence topic was constructed according to a structured protocol. This protocol is fully described in the ICVTS [1].

2. Clinical scenario

You have just started a cardiothoracic rotation as a specialist registrar and you have been assisting your consultant with a straightforward coronary artery bypass graft case and he has left you to ‘close the chest’. You have achieved meticulous surgical haemostasis and have started suturing the sternum. Your scrub nurse reminds you not to forget the tranexamic acid washout, which the consultant routinely uses for all his cases. You adhere to the consultant’s protocols but wonder what evidence is available to justify the routine use of topical tranexamic acid in cardiac surgery.

3. Three-part question

In (patients undergoing cardiac surgery) does (topical tranexamic acid) reduce the incidence of (post-operative bleeding).

4. Search strategy


[exp Cardiovascular surgical procedures/ OR cardiovascular surgical procedures.mp OR exp Thoracic surgery/ OR Thoracic surgery.mp OR exp Coronary Artery Bypass/ OR coronary artery bypass surgery.mp OR CABG.mp OR coronary surgery.mp OR cardiac surgery.mp OR revascularization.mp] AND [exp Tranexamic acid/ OR tranexamic.mp OR cyklokapron.mp]
The Cochrane Database of Systematic Reviews, ACP Journal Club DARE and CENTRAL were also searched.

5. Search outcome

132 papers were found in Medline, 300 papers were found in Embase, 3 papers were found in CINAHL, and 76 papers were found in the combined CDSR, ACP journal club, DARE and CCTR databases using the reported search. However, only 1 relevant paper was found which is presented in Table 1.

6. Comment(s)

Despite searching 7 databases with over 400 abstracts retrieved, only 1 paper was found assessing the use of topical tranexamic acid post-cardiac surgery, for the reduction in post-operative bleeding. Several other papers exist on the use of topical tranexamic acid to reduce bleeding after bladder, dental and gynaecological surgery, however, we felt that these studies would not be sufficiently relevant to cardiac surgery, where coagulation is significantly deranged during the procedure.

In addition intravenous tranexamic acid has been conclusively shown to reduce bleeding, with multiple studies having been summarized by Fremes et al. by meta-analysis [2] showing an overall 30% reduction in post-operative bleeding with its use. However, these papers are also not relevant in answering the question of whether topical tranexamic acid may possess the same properties.

Several experimental studies have demonstrated the molecular basis for the function of tranexamic acid, which acts by binding to the lysine-binding sites of plamin and plasminogen [3]. Saturation of these sites displaces plasminogen from the fibrin surface thus inhibiting fibrinolysis. However, again this is not directly relevant to answering our clinical question as to whether topical application is effective.

The only study was a double blinded controlled trial performed by De Bonis et al. in 2000 [4]. They randomized 40 consecutive patients undergoing primary elective CABG to have topical tranexamic acid or placebo. One gram of tranexamic acid was added to 100 ml of normal saline and poured into mediastinum. Fluid was applied, the sternum closed and then the mediastinal drains unclamped.


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Thus in summary only 1 small RCT exists in this area, which demonstrates a clinically small difference in blood loss with topical tranexamic acid and only studied low risk patients. Further RCTs should be performed (and could very easily be set up and conducted) prior to any further use of topical tranexamic acid as a strategy to reduce post-operative bleeding.

7. Clinical bottom line

Only 1 RCT exists to answer this question, which demonstrated a clinically small benefit in favour of
Topical tranexamic acid in low risk patients. Further RCTs should be performed prior to any further use of topical tranexamic acid as a strategy to reduce post-operative bleeding.

References


