Procedural risk for venous thromboembolism in abdominal contouring surgery: a systematic review of the literature
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CRD summary
This review concluded that circumferential abdominoplasty and abdominoplasty plus an intra-abdominal procedure significantly increased the risk of venous thromboembolism compared with abdominoplasty with concomitant plastic surgery or abdominoplasty alone. Given the potential for bias in the review, the simplistic statistical comparison employed and discrepancies in the results presented, the authors’ conclusions should be interpreted with extreme caution.

Authors’ objectives
To assess the procedural risk for venous thromboembolism in patients undergoing abdominal contouring surgery.

Searching
MEDLINE, EMBASE, and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched from inception to December 2007 for English language articles. Search terms were reported.

Study selection
Randomised trials of patients undergoing excisional body contouring procedures of any type over a three year period and reporting clinically evident deep venous thromboses and pulmonary embolisms were eligible for inclusion. Other study designs were also examined for information on venous thromboembolism complications. Data from the authors' institution, collected through a retrospective chart review, were also included in the analysis. Studies of patients undergoing multiple procedures, but without clear definition on the number of complications within the different procedures, were excluded.

Included studies performed the following procedures: abdominoplasty alone; abdominoplasty with concomitant plastic surgery (concomitant liposuction or plastic surgery of another area of the body); abdominoplasty with intra-abdominal procedure; and circumferential abdominoplasty (body lift, any type of circumferential excisional procedure).

The authors did not state how many reviewers screened studies for inclusion.

Assessment of study quality
The authors did not state that they assessed study quality.

Data extraction
The number of venous thromboembolism events (both deep venous thrombosis and pulmonary embolism) in each procedure group was extracted.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
The Χ² non-parametric test was used to compare the frequency of events between each procedure group.

Results of the review
Thirty retrospective, non-randomised trials were included in the review (n=4,520 patients).

There were no statistically significant differences in the rate of venous thromboembolism in patients undergoing abdominoplasty alone (n=1,189 operations; four events) versus those undergoing abdominoplasty plus concomitant plastic surgery (n=2,381 operations; 16 events reported, but calculated as 18 events), and no differences between
abdominoplasty plus intraabdominal procedures (n=507 operations; 11 events reported, but calculated as four events) versus circumferential abdominoplasty (n=529 operations; 18 events).

However, abdominoplasty plus intra-abdominal procedure ($X^2=6.11$, $p<0.02$) and circumferential abdominoplasty ($X^2=19.96$) showed statistically significantly higher rates of venous thromboembolism compared with abdominoplasty plus concomitant plastic surgery ($X^2=10.81$, $p=0.001$) and compared with abdominoplasty alone ($X^2=23.37$, $p<0.0001$).

Findings on the use of prophylaxis were also discussed in the review.

**Authors’ conclusions**
Circumferential abdominoplasty and abdominoplasty with intra-abdominal procedure put patients at significantly greater risk for venous thromboembolic disease compared with patients undergoing abdominoplasty with concomitant plastic surgery or abdominoplasty alone.

**CRD commentary**
The review question and inclusion criteria were broadly defined. The literature search involved three databases, but as it was restricted to articles in English, language bias may have been introduced. The authors did not state that they undertook each stage of the review process in duplicate, which meant that reviewer error and bias could not be ruled out.

The quality of the included studies was not formally assessed, but the authors acknowledged the limitations of retrospective data. The authors also acknowledged the limitations in combining findings due to the different patient populations and surgeon techniques. However, the statistical comparison undertaken was very simplistic and did not take into account the direct comparisons performed in the individual studies, or factors that may have differed across studies. Thus the results presented did not provide any useful direct evidence to determine the effectiveness of the interventions in comparison to each other. There were discrepancies in the number of venous thromboembolic events and frequency (%) presented in the tables, with the figures suggesting that similar frequencies occurred in patients undergoing abdominoplasty plus concomitant plastic surgery or an intra-abdominal procedure, which did not reflect the authors’ conclusions.

Given the limitations with the review process, the unknown quality of the included studies, the simplistic statistical comparison undertaken, and the uncertainty regarding the results presented, the authors’ conclusions should be interpreted with extreme caution.

**Implications of the review for practice and research**
**Practice:** The authors stated that patients undergoing excisional procedures should be risk stratified in order for appropriate perioperative thromboembolic prophylaxis management. They recommended that circumferential abdominoplasty and abdominoplasty in combination with intra-abdominal procedure should be categorised as higher exposing risk procedures according to the modified Davison-Caprini risk assessment model.

**Research:** The authors stated that multi-institutional randomised prospective trials are needed in the field of plastic surgery. They also stated that the addition of liposuction to procedures needs to be investigated thoroughly.

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