Impact of maze and concomitant mitral valve surgery on clinical outcomes
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CRD summary
This review compared mitral valve surgery plus maze procedure versus surgery alone in patients with atrial fibrillation. The authors concluded that adding the maze procedure is associated with an improvement in conversion to sinus rhythm and a possible reduction in embolic events, but does not improve survival. Methodological and reporting limitations mean that the conclusions should be treated with caution.

Authors' objectives
To evaluate the effects of treating atrial fibrillation (AF) by the surgical maze procedure in patients with AF undergoing mitral valve surgery.

Searching
MEDLINE was searched from 1995 to 2005 for English language articles using the keywords 'atrial fibrillation surgery', 'stroke risk reduction' and 'improved long-term survival'. The bibliographies of relevant studies were reviewed to identify additional references.

Study selection
Randomised controlled trials (RCTs) and matched-controlled studies that compared outcomes following mitral valve surgery combined with maze procedure versus mitral valve surgery alone in patients with AF were eligible for the review. The maze procedure was required to meet the criteria of the Cox maze III pattern, or its modification, and involve both atria. Studies using the 'cut and sew' method or ablation were eligible, but details of the techniques used in the included studies were not reported. The review assessed freedom from AF, freedom from embolic events and long-term mortality. The included RCTs used 24-hour Holter monitoring to assess heart rhythm; the matched controlled studies used 12-lead electrocardiographs. Where reported, the majority of participants in the included studies had chronic (permanent) AF; the proportion of male participants ranged from 15 to 67%.

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

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

Data extraction
Data on the numbers of events in each group were used to derive an odds ratio (OR) and 95% confidence interval (CI) for the outcomes of interest. The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
The studies were grouped by design and combined by meta-analysis, using a fixed-effect model. The results of tests for heterogeneity were presented but no details of the methods were reported. The authors did not state that they assessed publication bias.

Results of the review
Four RCTs (n=155) and 7 matched controlled studies (n=1,344) were included.

In the RCTs, after 12 to 18 months of follow-up, patients treated with the maze procedure were significantly more likely to be in sinus rhythm or free from AF than control patients (OR 9.01, 95% CI: 4.2, 19.3), but freedom from stroke and embolic events and mortality did not differ significantly between the groups. Statistical heterogeneity was not significant. In the matched controlled studies (follow-up of 2 to 8 years), all three outcomes significantly favoured the maze group, with ORs of 12.51 (95% CI: 9.18, 17.03), 9.35 (95% CI: 5.11, 17.13) and 2.27 (85% CI: 1.21, 4.27),
respectively. Significant heterogeneity was present for sinus rhythm or freedom from AF and for mortality.

**Authors’ conclusions**
The addition of the maze procedure to mitral valve surgery is associated with an improvement in conversion to sinus rhythm and a possible reduction in embolic events, but does not necessarily improve long-term survival.

**CRD commentary**
This review had clear inclusion criteria for the intervention, comparator, study designs and participants. The authors searched only MEDLINE (using a limited range of keywords) and reference lists, so it is possible that relevant studies could have been missed. Only English language studies were sought, and it appears that the authors did not seek unpublished studies or attempt to assess publication bias, thus the review could be at risk of language and/or publication bias. The validity of the included studies was not assessed, which makes it difficult to judge the quality of the evidence included in the review. The methods used to select studies and extract the data were not reported, so the risk of reviewer error and bias during the review process is difficult to assess. There were adequate details of the participants in the included studies but few details of the surgical procedures used, making it difficult to determine the clinical heterogeneity of the included studies. Where reported, most of the participants had chronic (permanent) AF, so the findings of the review may not apply to patients with other forms of AF. Studies of the same design were combined by meta-analysis. The results of tests for statistical heterogeneity were reported but the statistical methods used were not described. Significant heterogeneity was present for some outcomes, suggesting that meta-analysis might not have been appropriate. The authors’ conclusions are broadly in line with the evidence presented, but should be treated with caution in view of the methodological and reporting limitations of the review.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice.

Research: The authors stated that larger RCTs or propensity-matched studies with adequate follow-up are needed to determine the effect of concomitant maze surgery on clinical outcomes in patients with AF undergoing mitral valve surgery.

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