Abdominal myomectomy for infertility: a comprehensive review

Authors' objectives
To assess the overall effect of abdominal myomectomy on infertility.

Searching
MEDLINE was searched from January 1982 to December 1996 using the following MeSH terms: 'leiomyomas', 'myomectomy', 'uterus', 'infertility' and 'conservative surgery'.

In addition, handsearches of the following specialist journals were performed: American Journal of Obstetrics and Gynecology from January 1982 to December 1996; British Journal of Obstetrics and Gynaecology from January 1982 to December 1996; Fertility and Sterility from January 1982 to December 1996; Human Reproduction from 1996; Obstetrics and Gynecology from January 1986 to December 1996; and Current Contents (Clinical Medicine) from January 1986 to December 1996.

Additional reports were identified by systematically reviewing all references from retrieved papers, and by consulting gynaecological and surgical textbooks and monographs on uterine leiomyomas published in the last 10 years.

Only papers published in the English language were included. Proceedings of scientific meetings were excluded.

Study selection
Study designs of evaluations included in the review
There were no restrictions on study design.

Only studies in which results were presented as the proportion of pregnant to non-pregnant women after surgery were considered.

The length of follow-up ranged from 2 to 144 months in the 19 studies that reported it. In 12 studies, patients were followed for at least 12 months after myomectomy.

Specific interventions included in the review
Abdominal myomectomy. Myomectomy was generally performed at laparotomy. The exception was four studies in which either laparotomy or laparoscopy, or laparoscopy alone or combined with minilaparotomy, was used.

Participants included in the review
Fertile and infertile woman were included. Some women wanted children and some did not. In most studies, the mean age at surgery was greater than 30 years. Before myomectomy, infertility was caused by fibroids only in 10 studies, and by other associated causes in 12 studies (this was not clarified in one article).

Outcomes assessed in the review
Post-operative conception rates, time to conception, recurrence after myomectomy, and the incidence of re-intervention after recurrent myomas, were assessed.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The authors do not state that they assessed validity, although they comment that the quality of some evidence was poor.
**Data extraction**

Two authors abstracted data in an unblinded fashion using standardised forms. Any discrepancies between the evaluators were identified and resolved by consensus.

For each study, the post-surgical conception rate with the respective 95% confidence interval (CI) was calculated based on the binomial distribution.

Usual 2X2 tables were generated to compare pregnancy outcomes in women with and without other causes of infertility, in addition to uterine fibroids. Crude numbers were obtained from the authors when the results were presented as cumulative rates.

**Methods of synthesis**

*How were the studies combined?*

A combined estimate of pregnancy rates was only calculated across the prospective studies. The odds ratios (ORs) and their 95% CIs were calculated.

*How were differences between studies investigated?*

Differences between the studies were assessed using the chi-squared test for heterogeneity.

To limit the introduction of both qualitative and quantitative heterogeneity in the review, the authors included only the 9 prospective studies in their final analyses investigating the effect of myomectomy on infertility.

**Results of the review**

There were 23 articles comprising a total of 1,191 participants included in the review. Data were only collected from observational studies, due to the absence of comparative or controlled studies on this specific topic. All studies were observational and non-comparative, and only 9 were prospective.

Eleven studies involved only infertile women, 11 further studies included a mixture of fertile and infertile women, and 1 study involved only fertile women. The authors state that 5 studies included only women wanting children, although this was unclear from the figures tabulated.

The studies were found to be heterogeneous (chi-squared 90.53, d.f.=22, p<0.0001). This heterogeneity was thought to be mainly due to differences in the characteristics of the evaluated women, especially in terms of multiple causes of infertility in addition to myomas. The heterogeneity test for the 9 prospective studies was not significant (chi-squared 7.95, d.f.=8, p=0.44).

The crude pregnancy rate for all recruited women wanting children independently of fertility status was available for 6 studies; this ranged from 12 to 67%. The pregnancy rate relative only to infertile patients was available for all but one series; this ranged from 10 to 75%.

After the exclusion of retrospective reports, the combined estimate of pregnancy rates across the studies was 57% (95% CI: 48, 65), based on a total of 138 observed participants. Time to conception ranged from a mean of 8 to 20 months. Survival analysis was only used in 3 studies, with cumulative rates ranging from 57 to 67% at one year, and 63% at 5 years. The percentage point estimates of conception, along with their respective 95% CIs, were reported for both prospective and retrospective studies.

The overall conception rate among 7 prospective studies, in which 112 women with otherwise unexplained infertility were recruited, was 61% (95% CI: 51, 70), compared with 38% (95% CI: 20, 59) in 2 prospective studies that included 26 patients with causes of infertility in addition to myomas (chi-squared 4.25, p=0.04); the mean difference was 23% (95% CI: 1, 43) and the OR was 2.47 (95% CI: 1.03, 5.94). The conception rate in the 3 studies in which women with only intramural and/or subserous fibroids were recruited ranged from 58 to 65%, whereas in the 2 that included only patients with submucous myomas, the conception rates were 53 and 70%, respectively.
Thirteen studies reported data on recurrence after myomectomy and found rates varying from 4 to 47%. An average estimate was not calculated due to qualitative heterogeneity among studies. The incidence of re-intervention for recurrent myomas, which was reported in 12 studies, ranged from 0 to 14%.

Authors' conclusions
According to the available evidence, slightly less than two thirds of women with uterine leiomyomas, and otherwise unexplained infertility, conceived shortly after myomectomy. However, comparison with expectant management is needed before drawing conclusions on the effectiveness of this conservative surgical procedure. It is unclear if the prognosis was influenced by the site of the tumours. The authors state that the presence of additional factors impairing pregnancy, which may significantly worsen the reproductive prognosis, should be given adequate weight when deciding between different treatments.

CRD commentary
The authors presented a well-defined research question. Sufficient details of the individual studies were presented, and the primary studies were combined appropriately.

The literature search was fairly thorough, but since no attempt was made to identify unpublished material, publication bias cannot be ruled out. The inclusion and exclusion criteria were stated. However, it may have been appropriate to exclude one study which did not contain any infertile women. The follow-up periods ranged from 2 to 144 months. A longer minimum follow-up period would have been appropriate as 2 months of unsuccessful attempts to conceive a child is insufficient to ascertain fertility status.

The authors stated that the quality of the evidence from case studies and retrospective reports was poor, raising concerns over the potential for bias. In addition, no validity assessment was undertaken.

The authors pointed out that the characteristics of the individual studies varied widely, for instance, the duration of infertility, age at surgery, proportion of women with primary versus secondary infertility, prevalence of infertility factors other than myomas and the length of follow-up. This variation would considerably increase the clinical heterogeneity between studies.

The authors' conclusions follow from the results. However, they should be interpreted with caution considering the possible poor quality of the included studies, the inherent heterogeneity, and the lack of comparative data.

Implications of the review for practice and research
The authors believe that unbiased comparison with expectant management is needed before drawing definitive conclusions on the effectiveness of a time-honoured conservative surgical procedure such as myomectomy.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.