The accuracy of hysterosalpingography in the diagnosis of tubal pathology: a meta-analysis

Authors' objectives
To assess the value of hysterosalpingography (HSG) in diagnosing tubal patency and peritubal adhesions, compared with laparoscopy with chromopertubation as a 'gold' standard.

Searching
MEDLINE was searched from January 1968 to July 1994 for articles in English, French, German or Dutch, using the keywords 'hysterosalpingography' and 'laparoscopy'. All volumes of Fertility and Sterility, Human Reproduction, British Journal of Obstetrics and Gynaecology, Lancet and the British Medical Journal were handsearched from January 1974 to June 1994. The references in all selected articles were also examined.

Study selection
Study designs of evaluations included in the review
No inclusion criteria relating to the study design were specified. There was no detailed reporting of the design characteristics of the included studies.

Specific interventions included in the review
Studies evaluating HSG for tubal pathology were eligible for inclusion. The included studies were of HSG using oil- or water-soluble contrast media. Tubal pathology was defined as the absence of tubal patency (i.e. the absence of filling or the absence of overflow), or as the presence of peritubal adhesions.

Reference standard test against which the new test was compared
Only studies using laparoscopy as the reference standard were eligible for inclusion.

Participants included in the review
No inclusion criteria relating to the study participants were specified. Infertility patients suspected of having one or two closed tubes or having tubal adhesions, and undergoing both hysterosalpingography and laparoscopy, were included.

Outcomes assessed in the review
Articles not reporting sufficient data for the construction of 2x2 contingency tables of the test (HSG) and the reference standard (laparoscopy) for tubal patency and/or peritubal adhesions were excluded. For peritubal adhesions, only those patients in whom patency of at least one tube was demonstrated were included in the 2x2 table.

If studies reported on proximal and tubal patency, the data were analysed separately.

Sensitivity, specificity, and positive and negative likelihood ratios were the outcome measures calculated and reported in the review.

How were decisions on the relevance of primary studies made?
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
The authors did not state how data were extracted for the review, or how many reviewers performed the data
Methods of synthesis

How were the studies combined?
Due to heterogeneity, no summary estimates of sensitivity and specificity were calculated for tubal patency or peritubal adhesions. In the case where a negative correlation existed between sensitivity and specificity (as was the case for studies on peritubal adhesions), heterogeneity was considered to arise primarily from differences in the cut-off value for positivity between the studies (threshold effect) and a summary receiver operating characteristic curve was estimated.

How were differences between studies investigated?
Homogeneity of sensitivity and specificity was tested separately using the chi-squared statistic. Where the threshold effect was not considered a factor, possible sources of heterogeneity were examined using subgroup analysis. The predefined subgroups were: prevalence of tubal patency; type of contrast medium; use of spasmolyticum versus no spasmolyticum; academic versus non-academic setting; independent versus dependent judgement of patency; use of criteria for judgement of HSG; and the presence of peritubal adhesions. Homogeneity could not be rejected for a subgroup of three studies that judged HSG and laparoscopy independently; pooled estimates of the sensitivity and specificity were calculated for these studies.

Results of the review

Twenty studies were included, of which 19 (3,964 patients) were included in the analysis of tubal patency and 13 (1,894 patients) in the analysis of peritubal adhesions.

For all studies of tubal patency, the sensitivity ranged from 0.34 (specificity 0.89) to 1.00 (specificity 0.70 and 0.99), and the specificity ranged from 0.55 (sensitivity 0.82) to 0.99 (sensitivity 1.00).

Based on the three studies that used independent judgement of patency and which showed homogeneity, the point estimate was 0.65 (95% confidence interval, CI: 0.50, 0.78) for sensitivity and 0.83 (95% CI: 0.77, 0.88) for specificity.

For all studies of peritubal adhesions, the sensitivity ranged from 0.03 (specificity 0.98) to 0.83 (specificity 0.85), and the specificity ranged from 0.50 (sensitivity 0.77) to 0.99 (sensitivity 0.39).

Authors' conclusions

HSG is of limited use for the detection of tubal patency because of its low sensitivity, although it may be useful for ruling in tubal obstruction because of its high specificity. It is not reliable for the detection of peritubal adhesions.

CRD commentary

The review addressed a clear and well-defined question. Relevant inclusion criteria were defined. The search strategy used was somewhat limited, and there is a possibility that relevant studies may have been omitted. The possibility of publication bias was also not addressed. Neither the review methodology nor the details of the included studies were well described, and the methodological rigour of the primary studies was not assessed. It is therefore difficult to assess the extent to which biases may have been introduced, either by flaws in the process of the review itself or in the methodology of the included studies. The data analysis presented was appropriate and robust. Residual, unexplained heterogeneity within subgroups means that a detailed presentation of the participant and methodological characteristics of the included studies would have been of particular value.

The authors' conclusions follow broadly from the results presented. However, their interpretation of the utility of HSG for ruling in tubal obstruction may be optimistic given that it appears to be based upon the pooled estimate of specificity from only three studies, and given the broad range of specificities reported by the included studies. In general, the results of the review should be interpreted with caution in view of the methodological limitations.
Implications of the review for practice and research

Practice: The authors stated that, if HSG shows tubal obstruction, further investigations (e.g. laparoscopy) are unnecessary. However, if HSG shows no obstruction the results should not be interpreted as confirmation of tubal patency.

Research: The authors did not state any implications for further research.

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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.