# NONCONTRIBUTORY HYSTEROSALPINGOGRAM IN INFERTILITY EVALUATION

by

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Approximately 85% of married couple initiate a pregnancy within 12 months of attempting to achieve a conception (Moghissi, 1979), and the remaining 15% undergo investigations and treatment for infertility. Among them the aetiology for infertility varies, from female factors such as ovulatory disorders, tubal and uterine dysfunctions and cervical factors on the one side to male disorders such as oligospermia, azoospermia and sexual inadequacy on the other side. In addition, in about 10 per cent of patients no specific cause can be determined (Moghissi, 1979). Male factors are implicated in nearly 50 per cent of infertile couples (Rajan *et al*, 1981). Among the infertile women, 15 per cent have ovulatory defects (Moghissi, 1979), 5 to 10 per cent have cervical factors (Moghissi, 1979) and 14.5 per cent (Murray, 1953) to 37 per cent (Siegler, 1977) have tubo-peritoneal causes as the reason for the infertility.

Laparoscopy is presently the most commonly employed investigative procedure for the diagnosis of tubal and peritoneal causes of infertility (Steptoe and Edwards, 1970; Wheeless , 1976; Motashaw, 1977; Padma Rao, 1977; Varma and Murphy, 1978; Corson, 1979; Cumming and Taylor, 1980; Khandwala, 1979; Ambiye *et al*, 1981; and Rajan *et al*, 1982). However, considering the magnitude of the problems of infertility of which tubal disorder is only one of the contributing factors, laparoscopy is more often performed to exclude a tubal or a peritoneal disease. Thus, by excluding pelvic factors more attention can be focused on diagnosis of other causes of infertility.

Yet another approach to the diagnosis of tubal disorders is by employing hysterosalpingography (Siegler, 1977). This is a less invasive procedure which provides valuable information about the tubal lumen uterine cavity, provided the technic is perfected, findings are carefully interpreted and one is aware of its limitations (Rajan *et al*, 1981). Inspite of its diagnostic limitations, HSG has been considered the standard test for the initial evaluation of tubal factors associated with infertility.

It is well recognised that a positive HSG finding is always better confirmed by laparoscopy in view of the high incidence of false positive HSG reports (Siegler, 1977; Ansari, 1979 and Rajan and Joseph, 1982). If the normal or non-contributory HSG finding, just as the normal endoscopic finding, can be depended for excluding any pelvic pathology, then even a laparoscopic inspection may not be required wherever HSG findings are non-contributory. However, eventhough Siegler (1977) has proved that tubes found to

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be patent at HSG are never found blocked at laparoscopy or laparotomy, false negative findings in the form of inability to diagnose pelvic adhesions are reported by other authors (Abdel-Hady, 1978, and Pitkin and Zlantnik, 1979).

In a series of infertile subjects who had been investigated for tuboperitoneal factors both by HSG and laparoscopy (laparotomy in some) we have attempted to evaluate the incidence of false negative reporting of HSG, namely, HSG is normal but a pelvic factor is diagnosed by a subsequent laparoscopy. If very good correlation is established between a normal HSG finding and normal laparoscopic finding, HSG can be considered a reliable method of excluding pelvic pathology, and further laparoscopic confirmation may not be required. On the contrary, if correlation is poor HSG can be considered only as a basic investigation and quite often will have to be followed by laparoscopy.

*Material and Methods*

In our infertility service HSG is a routine integral part of female evaluation. In the initial visit a thorough pelvic examination is performed to locate any pelvic masses, indurations or nodules. HSG is performed in the early first half of cycle after complete cessation of menstrual flow. Water soluble contrast medium is injected through Leech-Wilkinson cannula. The entire procedure was completed under fluoroscopic control. The first antero-posterior film with 1 to 3 ml of contrast medium was used to study the uterine cavity (Fig. 1). Maintaining a constant flow-low pressure technic the second film was taken to study the tubal lumen (Fig. 1 & 2). After 5 to 10 minutes the third film was taken to study the pattern of peritoneal spill (Fig. 3). If necessary follow-up films were taken at intervals. Our technic of HSG (Rajan et al, 1981) and our method of interpretation of HSG findings (Rajan and Joseph, 1982) are detailed in our earlier communications.

We perform diagnostic laparoscopy for the following indications: (1) Infertile women above 30 years, (2) unexplained infertility of more than 1 year duration, (3) evaluating of abnormal HSG findings, (4) history and clinical findings suggestive of endometriosis, (5) failure to conceive after 6 to 8 cycles AID exposures, and (6) evaluation of endocrine status of the ovary.

Over a period of 4 years ending with December, 1982 we have performed laparoscopy (and laparotomy in a few) on 207 infertile women who had a prior HSG evaluation. We had preferred double puncture technic in majority of occasions and had taken meticulous care to inspect all the organs individually for evidence of any pathology. Tubal patency was established by trans-cervical instillation of methylene blue solution. From this study we could ascertain the diagnostic accuracy of HSG, particularly when the HSG findings were noncontributory.

*Analysis*: What we consider as normal, negative or noncontributory HSG is Fig. 1, 2, and 3. As indicated earlier we interpret HSG findings only with a minimum of 3 exposures: first exposure demonstrates the uterine cavity, the second the tubal lumen, and the third the pattern of peritoneal spill. When the uterine cavity is normal in shape and size and does not show any filling defect uterine factor is excluded Both tubes showing free flow of contrast medium with properly demonstrated ampullary rugation and prompt peritoneal spill indicate normal healthy tubes. Uniform pattern of dye distribution in pelvic peritoneal cavity

with no pocketting of dye in the localised areas and with no delayed tubal emptying, demonstrated in the 3rd film, is suggestive of absence of any peritoneal factors such as pelvic adhesions.

Peritoneal factors due to endometriosis or inflammatory adhesions involving the ovary, tube and or peritoneum is suspected with the following HSG findings: (1) Coiled, tortuous tubes showing delayed emptying and minimal peritoneal spill (Fig. 4) and these tubes may be quite often dilated and held up. (2) Obvious pocketted spill seen more clearly in the third film (Fig. 4).

Among the 207 subjects studied both by HSG and laparoscopy, 69 patients had HSG findings indicating normal or noncontributory appearance for tubal and peritoneal factors. Another 40 patients having tubal patency, evidenced findings in favour of a pelvic peritoneal factor such as adhesions. At laparoscopy, of the 69 subjects with noncontributory HSG findings all except 2, were observed to have no pathology involving the uterus, tubes, ovaries or the peritoneum (97.11%). Even the 2 subjects who had false negative HSG reporting had no tubal luminal pathology, but were having peritoneal adhesions. Incidentally all the 69 patients had no clinical findings at bimanual pelvic examination.

Whereas HSG of 40 patients had demonstrable peritoneal factor (tubal ovarian and or peritoneal adhesions) with obvious tubal patency, the same could be confirmed at laparoscopy laparotomy in 33 subjects (82.50%). In the remaining 7 patients (17.50%) there were no tubal or peritoneal factors detected at surgery. In this group of 40 subects majority had a positive pelvic finding at bimanual examination.

Considering all the 138 patients having positive HSG findings, either tubal or peritubal, absence of any type of pelvic pathology was confirmed at laparoscopy or laparotomy in 26 subjects, and this gives a false positive reporting by HSG in 18.84%.

*Discussion*

The purpose of tubal function testing in infertility practice is not only to diagnose any tubal pathology, and is more often aimed at excluding any tubal lesions. This is particularly applicable to situations where the primary cause of infertility is already known, such as ovulatory disorders, or a male factor. In such situations the purpose of tubal function study is only just to exclude any tubal pathology. However, in couples with no obvious ovulatory dysfunction or a male defficiency the chances of encountering a tubal factor is significantly high, and the tubal patency tests are bound to show some abnormal findings. Even clinically some pelvic factor may be diagnosed in such patients.

When no explanation can be found for the infertility by the regular basic investigative procedures, the 'unexplained infertility' group, a laproscopic inspection of the pelvis is always recommended. This is because the improved diagnostic technics should be able to uncover the etiology of infertility in an even greater percentage of such patients (Moghissi, 1979). Again laparoscopy is advised in patients who fail to conceive even after successful correction of ovulatory disorders or male defficiencies. Obviously, the purpose is to uncover any undetected pelvic pathology which could be contributing for the infertility.

Under these circumstances, for excluding a pelvic factor, we feel that HSG could be employed as an effective and reliable alternative to laparoscopy. We advance

the following arguments in favour HSG advocation: Among the 69 infertile patients who had no pelvic findings at bimanual pelvic examination and had a normal HSG finding, all except 2 proved to be normal and having no pelvic factor at laparoscopy. Otherwise, there is total diagnostic agreement between HSG and Laparoscopy for excluding pelvic pathology in 97.11 per cent. In addition, among the 40 patients with a patent tube and abnormal dye distribution in the pelvis indicating peritubal factors, pelvic adhesions were proved at laparoscopy or laparotomy in 33 subjects (82.50%). It means that by careful interpretation of HSG findings (with 3 or more properly timed exposures) in conjunction with the clinical observations a peritubal, periovarian or peritoneal factor can be diagnosed with reasonable accuracy. Moreover, in this group of 207 patients who were intensively studied for tubal patency and function, tubes found patent at HSG were never found otherwise at laparoscopy or laparotowy except in one subject. Hence it could be reasonably argued that there is only a remote possibility for a normal HSG appearance to be proved otherwise at laparoscopy, and hence HSG could be an equally good substitute for laparoscopy for excluding tubal and pelvic factors in infertile subjects. This has particular relevance to institutions and gynaecologists who are not regularly employing employing endoscopic diagnostic aids. Nontheless, a positive HSG finding need endoscopic confirmation to avoid unnecessary laparotomies.

## *Conclusion*

A normal or noncontributory HSG appearance has an excellent diagnostic accuracy, and excludes a tubal or peritoneal factor of infertility for all practical purposes. It is an equally reliable diagnostic substitute for laparoscopy in excluding pelvic pathology in patients with unexplained infertility and subjects treated for other causes of infertility such as ovulatory dysfunction or male disorders. By adhering to proper technic of HSG and careful interpretation in view of its limitations, best diagnostic accuracy can be ensured. If a properly performed and carefully interpreted HSG, in a patients with no clinical pelvic findings, shows a normal appearance in the properly timed 3 exposures no further confirmation by laparoscopy may be required for excluding a pelvic factor, and more attention should be focussed on uncovering other aetiological factors for infertility.

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*See Figs. on Art Paper X, XI, XII*