HYSTEROSALPINGOGRAPHIC EVALUATION PRIOR TO ARTIFICIAL INSEMINATION

by

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Many investigators Beck, (1974) Goss (1975), Dixon and Buttram (1976) and Shahani and Kulkarni (1978) have stressed the importance of careful consideration of the female fertility status in successful performance of artificial insemination. To maximise the results, in an area where prompt success is the goal, Beck (1974) has suggested employing hysterosalpingography or laparoscopy to confirm the tubal patency.

In our earlier study (Rajan, 1978) it was observed that a preliminary fertility work-up of the female, which included tubal insufflation test evidencing tubal patency and endometrial biopsy evidencing ovulation, resulted in an improved pregnancy rate for AID. Those women, in whom the preliminary investigations revealed no abnormality but failed to conceive even after 3 to 6 cycles of insemination, were further investigated with a hysterosalpingogram (HSG) for evidence of any undetected tubal or uterine factors. It was realised that 33 per cent of those women who had unsuccessful attempts at AID had some impediment for conception which could be detected by HSG, (Rajan *et al*, 1979). Moreover, 43 per cent of the patients who had normal findings at HSG conceived subsequently within 1 to 5 cycles of exposure.

Interested in these observations we elected to include HSG as a basic investigative procedure for all women undergoing artificial insemination. The place for such a detailed fertility work-up of the female, undergoing insemination,, is discussed in this article. The results are also compared with the group who were not investigated with HSG prior to insemination.

Donor artificial insemination was performed by the first author for 120 infertile couple over a period of 2 years (from June 1976). Irremediable male factor was the indication for insemination in all the subjects (Table I). Excluding those who had not reported regularly for the treatment, at least for 3 cycles, 96 women who had regular insemination were considered for the study. These patients can be divided into 2 groups depending on whether they were subjected to priar HSG evaluation or not. Group A includes 51 women in whom the tubal patency was diagnosed by air insufflation method, and group B includes 45 women whose tubal function was evaluated with HSG. In either group ovulation was

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TABLE I
Indications for A.I.D. in 120 Couples

Details of the male factor	No. of patients
Azoospermia	
Obstructive azoospermia	14
Germinal layer alpasia	16
Tubular fibrosis	15
Klinefelter's Syndrome	7
Spermatogenic maturation arrest	11
Multiple lesions	5
Not biopsied	31
Oligospermia	15
Necrospermia	2
Aspermia	1
Bilateral Cryptorchidism	3
Total:	120

evidenced by premenstrual endometrial biopsy and/or basal body temperature curve (BBT).

Group A: These patients, after a thorough clinical evaluation, were investigated in the following order: A premenstrual endometrial biopsy was obtained for diagnosing ovulation and detecting any endometrial pathology. Tubal patency was confirmed by air insufflation method. Many of these patients could maintain a basal body temperature recording (BBT), which in addition to detecting ovulation, could be a valuable aid in proper timing of insemination. After completing all the investigations the patients were given appointment for insemination. Two exposures on alternate days, either 12th and 14th days of the cycle or the probable days of ovulatory phase indicated by the BBT, per cycle for at least 3 to 6 consecutive cycles were considered mandatory for the assessment of the results of AID.

Group B: All women in this group were investigated with a HSG for evidence of any tubal or uterine factors. The HSG was performed in the preovulatory phase of the cycle, but after complete cessation of menstruation. Water soluble dye, earlier Diagina viscous and subsequently Verografine and Conray 420 were employed for the study. Ovulation was determined in all these women either by a prior endometrial biopsy or more often by temperature recording. As indicated earlier for group A patients, insemination was done on two alternate days in and around the ovulatory phase of the cycle. For women were inseminated in the same cycle of HSG.

Fresh semen samples of good quality, collected from healthy medical students were used for AID. Insemination was performed with the patient in the dorsolithotomy position, and the semen sprayed over the cervical os and placed in the vaginal fornix.

Group A: (Non-HSG group) Twenty-nine of the 51 women conceived giving a success rate of 56.86 per cent. The number of cycles of exposure for successful insemination ranged from 1 to 6 with a mean of 2.45 cycles. Among the 29 women who were successfully inseminated, 14 (48.27%) conceived by the first attempt, another 9 (31.03%) conceived by the second attempt, and 5 more (17.24%) did so by the third attempt. So much so, of those who became pregnant 96.54 per cent did so within 3 cycles of insemination, and all of them conceived by 6 cycles.

Group B: (HSG group) Analysis of the case records of the 45 patients belonging to this group revealed the following: None of the patients had any tubal dysfunction as evidenced by the HSG. A marked subseptate uterus detected in a patient was the only uterine anomaly in this group. Thirty patients in this group,

including the one with subseptate uterus, conceived (66.60%), within a treatment cycle of 1 to 8 months, with a mean of 2.53 cycles. Of those who were successfully inseminated, 10 women (33.30%) conceived in the first attempt, 10 more (33.30%) in the second cycle, and another 3 women (10.00%) by the third month. Accordingly, only 76.60 per cent of all the pregnancies have been conceived within 3 cycles of insemination, and 96.60 per cent within 6 cycles.

It is a fact that, on comparison, the HSG group reveals a 10 per cent increase in the success rate as against the non-HSG group. But for this minimal increase in the pregnancy rate there appears to be no other advantage that can be claimed by the HSG group. That no tubal dysfunction was detected by HSG in the 45 women inseminated, again raises the question as to whether HSG should be done in all normal women as a routine. However, the number is too small to conclude on the diagnostic role of HSG. One distinct advantage of HSG evaluation is that insemination is undertaken after making sure about the functional status of the fallopian tubes, and repeated failures may be attributed to other infertility factors such as ovulatory irregularities.

Discussion

The biggest single factor in successful insemination with donor semen is the availability of good quality semen. As stated by Ansbacher (1978). the early enthusiasm for using frozen semen has been tempered in the past 2 years mainly as a result of the lowered conception rates achieved. Nevertheless, fresh semen gives universally good results, the success rate generally ranging from 70 to 75 per cent (Steinberger and Smith, 1973; Behrman, 1968; and Chong and Taymor, 1975. Hence the preference is always in favour of employing fresh semen.

Besides the availability of good quality fresh semen, the other most important factor that determines the success rate of AID is the fertility status of the recepient. So much so it is better that insemination is not attempted until the wife's fertility has been evaluated. However, the method of investigation may differ. In our earlier studies (Rajan, 1978) we have employed simpler methods of investigations such as air insufflation test for determining the tubal patency, and this procedure has resulted in improved pregnancy rate for AID.

Dixon and Buttram (1976) report a lower success rate, possibly due to the inclusion of patients who were not thoroughly screened or who had diagnosed pelvic abnormalities known to compromise fertility. Majority of the patients reviewed by them did not choose to undergo further evaluation after clinical examination had indicated that they were normal. According to these authors, a complete work-up on each patient is not feasible or even necessary, but if a patient presents with a suspect history or if physical examination indcates the possibility of some abnormality, or if the patient who is apparently normal fails to conceive within 3 to 6 cycles, a detailed investigation preferably endoscopic evaluation must be recommended.

Beck (1974) has suggested not to perform insemination without a proper female evaluation. In order to maximise the results he has preferred to confirm tubal patency by either hysterosalpingography or laparoscopy. He has also recognised problems of ovulation and cor-

rected the same during the cycles of insemination.

Klay (1976) has discussed the role of regulation of ovulation by clomiphene citrate, since successful AID depends also on an accurate determination of ovulation and proper timing of insemination. Incidentally this approach also corrects any existing ovulatory problems. The attractive results coupled with the minimal complications support the treatment modality advocated by Klay.

Shahani and Kulkarni (1978) have performed insemination after a complete infertility and endocrinological study of the patient. Cervical mucus study and urinary oestrogens estimations were carried out during the periovulatory period. Endometrial biopsy and progesterone assay were performed to confirm ovulation and corpus luteal function.

Rajan *et al* (1979) have selectively studied a group of women whose clinical examination as well the preliminary investigations had indicated that they were normal, but could not conceive even after 3 to 6 cycles of insemination. All these patients were subjected to a hysterosalpingographic evaluation to detect any pelvic abnormality that may compromise fertility, which was missed by the preliminary investigaton. A pelvic factor responsible for sterility was diagnosed in 33% of these women. Of those who had normal HSG findings 43 per cent conceived following subsequent attempts at insemination.

Results for AID following various methods of investigations suggested by different authors are delineated in Table II.

TABLE II

Results for A.I.D. Following Different Methods of Female Fertility Workup

Author(s)	Year	Method of female evaluation	Pregnancy rate %
Beck	1974	Complete female evaluation including HSG of leparoscopic confirmation of tubal function	75 to 90
Dixon and Buttram	1976	Clinical examination alone, and no female investigations	44.90
Klay	1976	Clomiphene regulated ovulation	90.00
Sahani and Kulkarni	1978	Endocrinological 'evaluations (urinary oestrogens and progesterone assay)	50.00
Rajan *et al*	1978	Preliminary investigations of the female—clinical examinaton, endometrial biopsy and tubal insufflation test	58.20
Present study	1978	Complete female evaluation including hysterosalpingographic confirmation of tubal patency	66.60

Since we found HSG as the least imposing procedure which provides valuable informations about the uterus and fallopian tubes at the cost of a negligible risk to the patient, we considered a

routine print evaluation of all women with HSG. As demonstrated by Parekh and Arronet (1972) negative finding in HSG is highly significant as it practically rules out a pelvic factor with a minimal error of 2.5 per cent. Hence, if the HSG is normal the patient can be considered fit to undergo AID and an improved success rate can be anticipated. Any abnormal HSG finding may be further confirmed by laparoscopy or laparotomy and treatment decided accordingly.

However, in this present series none of the patients investigated had any tubal dysfunction diagnosed by HSG. While all were subjected to insemination, a 10 per cent increase in the success rate could be recorded as against those inseminated following tubal insufflation test. Nevertheless, there was no improvement in the HSG group over the non-HSG group in terms of the average treatment cycles required for conception or the percentage of pregnancy in a particular cycle.

Whereas, the improvement in pregnancy rate is only minimal the main advantage of HSG evaluation is that any pelvic abnormality is practically ruled out before attempting AID. And failure to conceive, as experienced in the 33.40 per cent of women, even after such a thorough screening points towards improper timing of insemination. At this juncture it may be worthwhile considering regulation of ovulation with clomiphene citrate as a valuable aid to ensure maximum success in this field.

Taking into consideration the merits of the various investigative procedures the female and the role of ovulation regulation in AID, we have elected to perform AID in our newer patients in the following manner: Following a detailed clinical evaluation a premenstrual endometrial biopsy and hysterosalpingography are done to rule out any factors that may compromise fertility. After this meticulous screening, clomiphene citrate was administered to regulate ovulation, which enables proper timing of insemination. Occurrence of ovulation and its approximate time are confirmed by the BBT. On the predetermined days insemination is carried out with good quality fresh semen. This approach, we feel, will ensure the maximum results for inmination. Those patients who still fail to conceive, and undergo 3 to 6 unsuccessful attempts, are further investigated by laparoscopy or laparatomy. If any pelvic factor diagnosed corrective surgery is performed and insemination resumed.

Conclusion

The authors conclude that a thorough screening of women undergoing AID, by hysterosalpingography and premenstrual endometrial biopsy, even if they are clinically normal, is always preferable. This approach, by ruling out any impediment for conception, enables selection of the fit candidates for insemination. Incidentally, a greater success rate also is ensured. Role of clomiphene regulated ovulation in further improving the results of insemination is discussed.

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