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Radiologic evaluation of incremental intrauterine instillation of contrast material

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Several techniques of assisted reproduction are currently available to couples with infertility problems. Homologous intrauterine artificial insemination (IUI) has become a popular method because of its simplicity, low operational cost, and ambulatory character. However, there is serious disagreement about the results of the procedure. Because various investigators deposit different volumes of material in the fundus of the uterus (0.2 mL [1], 0.3 mL [2], 0.5 mL [3], or 1 mL [4]), it is not clear whether the washed spermatozoa would reach the uterus only or also penetrate the tubes. Because the junction of the ampulla with the tubal isthmus is the habitual site of fertilization, it is important to directly determine the efficacy of an insemination technique to deposit sperm at this level. The objective of the present study was to determine the effect of the volume of material injected on the location reached by the liquid column.

MATERIALS AND METHODS

During the investigation of the causes of marital infertility, a total of 10 women (mean age, 29.67 ± 6.28 years) with infertility duration of 5.39 ± 3.57 years were scheduled for hysterosalpingography (HSG). However, before the execution of HSG, a simple x ray was obtained for each patient immediately after the injection of different volumes of radiopaque dye (Vasurix; Guerbet Laboratories, Rio de Janeiro, Brazil). The following volumes were injected: 0.2 mL (patient 1); 0.3 mL (patients 2, 3, and 4); 0.4 mL (patient 5); 0.5 mL (patients 6 and 7); 0.6 mL (patient 8); 0.7 mL (patient 9); and 1.0 mL (patient 10). The technique for introducing the radiopaque dye was the same as used for the IUI technique, i.e., a 4.5-cm Frydman catheter (Laboratoire CCD, Paris, France) coupled to a 1-mL syringe was filled with dye, and its tip was advanced to a point approximately 0.5 cm from the fundus of the uterus. The presence of radiopaque dye in the uterus and/or tubes was determined immediately after injection by radiography (Fig. 1). All patients gave informed consent to participate in the study that was approved by the Hospital Ethics Committee.

RESULTS

The results of radiopaque dye injection are reported in Table 1. The injection of 0.2 mL did not lead to contrasting of the tubes. All injections from 0.4 mL to 1.0 mL resulted in contrasting of the uterus and tubes.

DISCUSSION

The efficacy of IUI varies widely, a fact probably, at least in part, because of the different variables

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related to the use of the technique in different laboratories. For these reasons, there is controversy about the use of IUI during a natural cycle or a stimulated cycle, the number of inseminations per cycle, the final concentration of inseminated sperm, and the laboratory methods used for sperm washing. If we assume that the procedure used in the present study fully mimics IUI, we may conclude that radiopaque dye volumes of 0.4 mL or more corresponded to uterine-tubal insemination, as indirectly indicated by the presence of radiopaque dye in the uterus and tubes, whereas IUI could be defined as "purely intrauterine" only when volumes of 0.2 mL are injected. Because different authors have reported volumes of material inseminated into the uterine cavity ranging from 0.2 mL to 1 mL, the present study demonstrates that the volume of inseminated material is an additional source of variation in the results obtained by IUI.

Thus, the contradictory reports about IUI [5] may be partially or totally related to the fact that the inseminated spermatozoa may or may not reach the tubal fertilization site. Furthermore, intratubal inseminations by intratubal catheters through ultrasound-guided techniques could easily replace IUI using volumes over 0.3 mL. Our data suggest that the results of insemination (intrauterine or uterine-tubal) should be related to the volume of material injected into the uterus.

Table 1 Presence of Radiologic Contrast in the Uterus and/or Tubes After the Injection of Different Contrast Dye Volumes

		Radiologic contrasting		
			Tubes	
Case	Dye volume	Uterus	Isthmus	Ampulla
	mL			
1	0.2	+	−	−
2	0.3	+	−	−
3	0.3	+	+	−
4	0.3	+	+	−
5	0.4	+	+	+
6	0.5	+	+	+
7	0.5	+	+	+
8	0.6	+	+	+
9	0.7	+	+	+
10	1.0	+	+	+

SUMMARY

In view of the contradictory results of IUI reported in the literature, the present study was undertaken to determine whether the volume of material injected into the uterus can affect the delivery site of the sperm. Ten infertile women scheduled for HSG were submitted to intrauterine injection of different volumes of radiopaque dye (0.2 mL to 1.0 mL) before the procedure to mimic IUI. An x ray taken immediately after injection showed that volumes of ≥0.4 mL reached the uterus and tubes, whereas the 0.2-

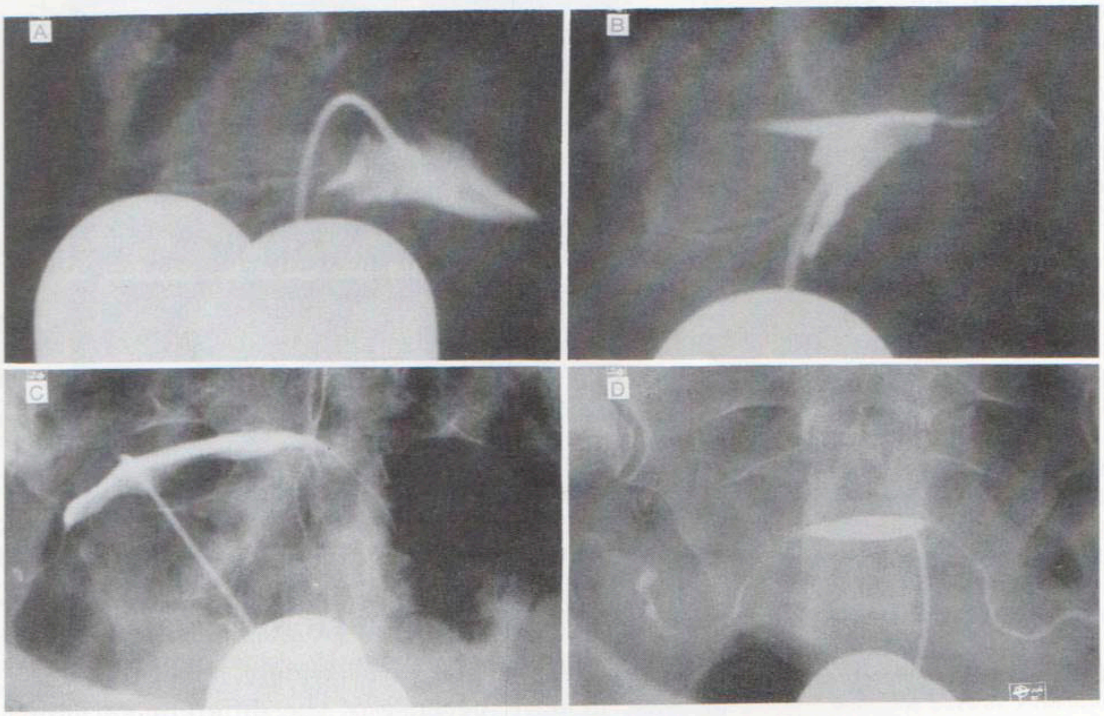

Figure 1 Injection of different volumes of radiopaque dye (**A**), 0.3 mL did not lead to contrasting of the tubes. (**B**) 0.3 mL resulted in contrasting of the uterus and one of the tubes. The injection of 0.4 mL (**C**) and 0.7 mL (**D**) was followed by contrasting of the tubes.

mL volume did not reach the tube. These data show that volume injected is an important variable in IUI.

Key Words: Insemination, intrauterine, volume injected.

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