Evaluating the Possibility of Uterine Transfer by Ultrasonically Guided Transabdominal Puncture

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Ultrasonically guided transvesical puncture of the uterine endometrial cavity was carried out in 16 patients to evaluate the feasibility of embryo transfer by this procedure. Instillation of fluid into the uterine cavity was achieved in all cases and easily performed in 15 patients. In one patient the fundal endometrium was reached in the third attempt. Instillation of fluid within the endometrium was attempted unsuccessfully in four patients, as the fluid leaked into the uterine cavity. In 12 patients 2–3 ml of fluid was injected. The fluid passed down through the cervix in patients in the luteal phase (nine patients) when 3 ml or more was injected. When a smaller amount of fluid was instilled it remained inside the cavity. In one patient in the preovulatory phase the fluid was actively pumped by uterine contractions into the vagina. Two cases in the proliferative phase showed no leakage from the cervix when 1.5 and 2 ml of fluid was injected, respectively.

KEY WORDS: embryo transfer; ultrasonic puncture.

INTRODUCTION

The pregnancy rate in in vitro fertilization (IVF) programs following embryo transfer (ET) remains consistently below 25% even at the most successful centers (1). Several explanations for this low pregnancy rate following transfer of apparently healthy embryos may be considered. First, the quality of the endometrium after ovarian stimulation and follicular aspiration could inhibit implantation.

Second, the embryos may be damaged by culture in vitro and be unable to develop beyond a certain stage. Finally, the fluid containing the embryos at transfer might be squeezed down the cervical canal, which is opened by the passage of the transfer catheter. Injecting the fluid with the embryos within the endometrium would further hinder discharge and avoid ectopic pregnancies.

The aim of this study was to evaluate a new transfer technique of injecting the embryos into the uterine cavity or the endometrium by means of ultrasonic-guided puncture.

MATERIALS AND METHODS

Patients

This study was carried out on 2 women admitted for laparoscopic sterilization and 14 infertile women admitted for diagnostic laparoscopy. Informed consent was obtained prior to the procedure. Sixteen patients consented to participate.

Procedure

An Aloka 270 with a 3.5-MHz curved array puncture transducer was used for scanning and puncture (Aloka Co. Ltd., 6-22-1, Mure, Mitaka-Shi, Tokyo, 181 Japan). General anesthesia was induced and the urinary bladder was filled by a catheter with 300–600 ml of normal saline guided by the ultrasound picture until a suitable pathway to the endometrium was seen. The puncture transducer was sterilized by soaking in 70% alcohol and the puncture was carried out under sterile surgical conditions.

An 18-gauge needle (1.2 mm in outer diameter,
0.8 mm in inner diameter) with a stylet and a length of 18 cm (MEDA AS, Dynamovej 11, DK-2730 Herlev, Denmark) was introduced via the bladder into the uterus, where the needle tip was identified by ultrasound (Fig. 1) in the endometrium of the front wall as well as the back wall or in the cavity. The stylet was removed, and a syringe containing culture medium attached to the needle. Variable amounts of fluid were injected and visualized by ultrasonic screening as well as by observing with a vaginal speculum the external cervical os for evidence of fluid escape.

RESULTS

The endometrium was entered by the needle in all patients. In all but one patient an optimal position of the needle was obtained in the first attempt. In one case where a more oblique approach was attempted, the needle point reached the endometrium almost at the internal os and a correct position of the needle tip was achieved only in the third puncture.

In the first four patients 100 µl of fluid was injected both in the front layer and in the back layer of the endometrium. No resistance to the injection was felt. The air which filled the needle when the stylet was removed was injected before the fluid and was visualized clearly on the screen before spreading in the uterine cavity (Fig. 2). The injected fluid did not remain within the endometrium but quickly passed into the uterine cavity. The passage of the fluid could be clearly followed on the screen display.

In the remaining 12 patients 1.5–5 ml of fluid was injected into the uterine cavity and their dispersal was followed using ultrasound screening and by observing the external os (Table I). In four patients 1.5 ml of fluid was injected without escaping through the cervix. Three of these patients were in the luteal phase and one was in the proliferative phase. In the latter, the ultrasound showed a dilatation of the cavity (Fig. 3). In one of the cases in the luteal phase a complete resistance against further injection was felt.

Two milliliters of fluid was injected in three patients. One was preovulatory, and the fluid was expelled through the cervix by uterine contractions registered by ultrasound and appeared at the external os. The second patient having 2 ml of fluid injected was in the proliferative phase and neither resistance to injection nor leakage was noted. In the third a resistance to injection was noticed after

Fig. 1. Longitudinal scan showing the uterus (U) with the needle tip (arrow) in the endometrial layer. B, urinary bladder; I, intestines.