ABSTRACT: Purpose. We assessed the role of preoperative sonohysterography in the diagnosis of intrauterine synechiae.

Methods. Nineteen patients with a suspected diagnosis of intrauterine adhesion underwent hysterosalpingography, transvaginal sonography, and sonohysterography performed in the consultation room. The patients were then treated by hysteroscopy under laparoscopic or ultrasound guidance.

Results. Transvaginal sonography showed an abnormal uterine cavity in only 10 cases. The sensitivities of sonohysterography and hysterosalpingography in the diagnosis of intrauterine adhesions were both 100%. Sonohysterography showed complete correlation with hysterosalpingography.


Keywords: synechia; transvaginal ultrasonography; transvaginal sonohysterography; hysteroscopy

PATIENTS AND METHODS

Nineteen patients with a history of repeated miscarriages or secondary amenorrhea were referred to our department for investigation of suspected IUAs in 1997. All patients were confirmed to be ovulatory by measurement of serum luteinizing hormone, follicle-stimulating hormone, estradiol, and progesterone. All 19 patients first underwent HSG (Figure 1). IUAs were classified according to the American Fertility Society classification system as stage I, mild; stage II, moderate; or stage III, severe. Complete IUAs were excluded because in such a case neither HSG nor SHG is informative.

Each patient then underwent conventional B-mode TVUS carried out in the luteal phase of the menstrual cycle. TVUS gives more information about the uterine cavity during the luteal phase, especially when congenital or acquired pathologic conditions are suspected. All TVUS and SHG procedures were performed with an Ultramark 9 (Advanced Technology Laboratories, Bothell, WA) or Sonoline AC (Siemens, Erlangen, Germany) ultrasound scanner using a 5-MHz endovaginal probe. All the TVUS examinations were performed by the same operator, who was unaware of the HSG results. The pelvic sonographic examination routinely included assessment of the position, size, and structure of the uterus. A diagnosis
of IUA was made if the thickness of the endome-
trium was less than 2 mm, which is unusual in
the luteal phase; if the uterine cavity was asym-
metric on a transverse scan; or if an echogenic
area was seen inside the uterine cavity.

After conventional TVUS images were ob-
tained, SHG was performed (Figure 2). Fluid was
instilled in the uterine cavity to induce distention,
thus considerably improving sonographic con-
trast. The procedure was carried out in the con-
sultation room and required a gynecologic exami-
nation table. The uterine cervix was exposed with
a speculum and disinfected with iodine solution.
A syringe containing 50 ml of isotonic saline so-
lution was attached to a polyethylene catheter
(18.5 cm long; 1.6 mm external diameter; 1.1 mm
internal diameter; CCD Laboratories, Paris,
France), which was introduced into the cervix.
The catheter had no balloon. The speculum was
then withdrawn and the endovaginal probe intro-
duced into the vagina. Transverse and sagittal
images were recorded during injection of the sa-
line solution. An IUA was suspected if an echo-
genic area between the anterior and posterior
walls was demonstrated on a transverse image of
the liquid-filled uterine cavity. The IUA was clas-
sified as stage I, II, or III, according to the Ameri-
can Fertility Society classification system.

Thereafter, HS was performed by the method
of March et al with the patient under general
anesthesia. Isotonic saline solution was used as a
distention medium. Synechiae were cut using
pointed scissors. The procedure was monitored by
either abdominal sonography or laparoscopy. An
intrauterine device was implanted for 15 days,
and prophylactic antibiotics were administered.
Patients were treated with estrogen only if the
surgery had been particularly extensive. Evaluation
of the success of the surgical procedure was
performed 45 days after surgery by repeat TVUS,
SHG, and HS using the techniques described
above.

RESULTS

Results are summarized in Table 1. All 19 pa-
tients had IUAs on HSG and SHG. TVUS showed
an abnormality of the uterus in 10 cases: a hypo-
plastic uterine cavity with an endometrial thick-
ness of 3 mm in 1 patient and an echogenic area in
the other 9 patients. The sensitivities of HSG and
SHG in the diagnosis of IUA were both 100%,
whereas the sensitivity of TVUS was only 52%.
There was complete correlation between HSG and
SHG. In all cases, full distention of the cavity dur-
ing SHG was impeded by tethering of the walls by thin or thick bands or synechiae. However, no failure of the SHG procedure occurred because there were no complete IUAs.

The therapeutic results were checked 45 days after surgery. In all cases, the entire cavity could be examined by SHG; and in all cases, the surgery was considered to be successful. There was com-

### TABLE 1
Findings in 19 Patients with Intrauterine Adhesions

<table>
<thead>
<tr>
<th>Patient</th>
<th>Obstetric History</th>
<th>Location of IUA on HSG</th>
<th>TVUS Findings</th>
<th>SHG Findings</th>
<th>Post-treatment HS Findings</th>
<th>Post-treatment SHG Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Miscarriages</td>
<td>Isthmus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>3</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>4</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>5</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>6</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>7</td>
<td>Miscarriages</td>
<td>Isthmus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>8</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>9</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>10</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>11</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>12</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>13</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>14</td>
<td>Induced abortion</td>
<td>Corpus</td>
<td>Endometrium 3 mm thick</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>15</td>
<td>Miscarriages</td>
<td>Fundus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>16</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>17</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>18</td>
<td>Miscarriages</td>
<td>Corpus</td>
<td>Normal</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>19</td>
<td>Induced abortion</td>
<td>Corpus</td>
<td>Hyperechoic focus</td>
<td>Adhesion</td>
<td>Normal</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Abbreviations: HSG, hysterosalpingography; TVUS, transvaginal sonography; SHG, sonohysterography; HS, hysteroscopy.
complete correlation between postsurgical SHG and HS.

**DISCUSSION**

On TVUS, an echogenic area in the endometrial cavity or an asymmetric thickness of the endometrium on a transverse scan of the uterus is highly suggestive of the presence of an IUA.\(^7\) Schlaff and Hurst\(^1\) have shown that TVUS may have a prognostic value in Asherman’s syndrome. Patients with an endometrium thinner than 2 mm in the luteal phase did not benefit from surgery, and the authors recommended that treatment be avoided if the endometrium is vestigial. However, sonography has not played a significant role in the diagnosis of intrauterine synechiae.

Our results indicate that SHG may become a powerful tool to define the uterine cavity’s anatomy and to diagnose congenital and acquired pathologic conditions. Although our series is small, we have previously reported our experience with SHG in 104 cases of endometrial abnormalities.\(^8\) In that study, SHG enabled clear visualization of IUAs. With injection of a contrast agent, TVUS can be carried out independently of the follicular or luteal phase, and the procedure takes only a few minutes. Among the failures that we encountered were 2 cases of IUA in which the adhesion completely obstructed the uterine cavity. Injection of contrast medium or solution is not possible in cases of complete IUA. Those cases were not included in the present study. In 1993, Parsons and Lense\(^9\) also reported an SHG failure because of complete IUA. With this exception, they concluded that there is perfect correlation between SHG and HS in staging IUAs (according to the American Fertility Society criteria).

SHG can be performed easily in cases of partial IUA. Twenty to 30 ml of saline solution is enough for the procedure,\(^10\) although an increase in injection pressure may sometimes be necessary. Excess liquid escapes naturally from the cervix. Confirmation of total surgical resection of the adhesions is important before a new pregnancy can be allowed. Many teams use HS to verify this, but SHG enables complete investigation of the cavity after surgery and is less invasive.\(^11\)

Our experience with SHG may change our strategy for the diagnosis of Asherman’s syndrome. With SHG, it is possible to perform a complete ultrasound examination of the uterine structure including the uterine cavity and muscles. The ease and simplicity of diagnosis have led us to routinely perform SHG after TVUS in cases of repeated spontaneous miscarriages or suspected uterine abnormality. We believe that SHG is now the method of choice for the diagnosis of acquired abnormalities of the uterus.

**REFERENCES**