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Hysterosalpingography in an Infertile Woman: Case Study and Clinical Considerations

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A B S T R A C T

Women of childbearing age require special attention when undergoing gynecologic procedures and examinations in the radiology department. Hysterosalpingography is a procedure that can determine the shape, position, and size of the uterus, uterine cavity, and fallopian tubes. It involves administration of radiopaque contrast media via a cannula or catheter inserted into the uterus through the uterine cervix. The injection of contrast can outline the uterine cavity and fallopian tubes. The procedure is commonly used to determine patency of fallopian tubes in infertile women of childbearing age when other causes of infertility have been ruled out or as part of an infertility diagnostic evaluation. The examination should be scheduled approximately at the tenth day of the menstrual cycle, where the first day of bleeding is considered day one. It is particularly important for the woman of childbearing age to determine that she is not pregnant. This article presents a clinical case study of an infertile woman undergoing hysterosalpingography to determine tubal patency. Safe and effective care measures and management for hysterosalpingography techniques in the radiology department are reviewed.

Case study

Candace (not her real name) is a 34-year-old Caucasian American female patient seeking treatment for infertility. The patient was interviewed by the clinic nurse, and her health history was obtained. She reported being married since age 30 to her current husband. The patient and her current husband have no children, and they desire pregnancy. Candace reported a history of sexual intercourse usually twice per week during the entire course of her current marriage, when the couple were together. Her husband experienced four military training missions/deployments during this marriage which caused the couple to be apart from one another intermittently. Candace and her husband have been married for more than 3 years, without a resulting pregnancy. Candace reported that she was aware that 1 year of unprotected sex without resulting pregnancy meets criteria for infertility. This prompted her visit to the clinic. Otherwise, she and her husband reported no health concerns. Candace stated, “We are both well and healthy, so we can't figure out why we're not getting pregnant.” The patient reported to the nurse that she had been purchasing over-the-counter ovulation predictor test kits and using them monthly without success when her husband was home. She reported being previously divorced once before but did not desire pregnancy in that first marriage. Candace reported that she has been sexually active since age 13 but had used contraception, withdrawal, and condoms from age 13 to 30 to prevent pregnancy. The patient reported to the nurse that from age 13 to 18 she was sexually abused by her stepfather, who is now deceased. During the years from age 13 to age 17, Candace reported that she was treated with antibiotics for sexually transmitted infections “a few times,” and was hospitalized once for the treatment of pelvic inflammatory disease (PID).

Candace's health-care provider, a family practice physician, asked her to purchase a basal body temperature thermometer and provided her with basal body temperature charts. Candace was instructed to take her temperature orally using the special thermometer at the same time each morning before getting out of bed or engaging in any physical activity. The basal body temperature data were to be obtained and recorded on the chart daily for a period of 3 months. This was an inexpensive and noninvasive method to determine if menstrual cycles resulted in ovulation for Candace. Candace was scheduled to return to the clinic for a 3-month appointment. After 3 months, Candace brought her basal body temperature charts back to the clinic for review by the health-care provider. The health-care provider could see temperature cycles that demonstrated temperature elevation on day 14 of each 28-

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day menstrual cycle. The health-care provider believed that Candace was ovulating but suspected fallopian tube scarring/blockage due to Candace's history of PID and infertility.

After the health-care provider explained risks and benefits of the procedure, Candace signed an informed consent for the hysterosalpingography (HSG) procedure. The health-care provider scheduled Candace for a HSG procedure in the radiology department of a local hospital. The examination was scheduled for a date that coincided with the 10th day of Candace's menstrual cycle (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). The first day of the cycle is counted as the first day of menstrual bleeding. The timing of the HSG is important to avoid the possibility that the client may be pregnant.

The HSG examination was scheduled for 10 AM. Candace was instructed to use a mild enema (i.e., sodium phosphate saline laxative) in the morning before the procedure to remove stool from the lower bowel. She was instructed not to eat breakfast before the examination. Candace was also instructed to take a mild, over-the-counter pain reliever, naproxen sodium 400 mg, orally 1 hour before the procedure to minimize cramping and discomfort.

When Candace arrived in the radiology department, the procedure was explained to her in greater detail to gain her cooperation with positioning and to allay anxiety. The radiologist, assisted by a radiology technician and a nurse, performed the examination. Candace was given time to empty her bladder in the ladies' room. After being escorted to a radiology suite, Candace was positioned supine in the lithotomy position for the examination, with her knees flexed and heels resting in the foot rests. A lubricated vaginal speculum was introduced into the vagina. The table was moved into a slight Trendelenburg position. Contrast media was injected via a syringe and cannula placed in the cervix. During the time when the cervix was cannulated and the contrast was injected, Candace complained of a tugging sensation and severe cramping pain. The contrast media was injected in fractional doses, and after each dose, a radiograph was obtained. In Candace's case, the 10 mL of contrast media was divided into fourths, and four images were obtained as a single anterior-posterior projection after each quarter dose. Approximately 5 mL of contract was used to fill the uterine cavity. An additional 5 mL was injected in half doses to demonstrate uterine fallopian tube patency and spillage of the contrast into the peritoneal cavity bilaterally (Figure 1). Figure 1 shows normal, open fallopian tubes bilaterally.

In Candace's case, the HSG showed the health-care provider that Candace's fallopian tubes were open and patent, despite her history of PID and sexually transmitted infections. The health-care provider referred Candace and her husband to a specialist in reproductive medicine so that both male and female factors contributing to infertility could be evaluated.

Discussion

HSG is used in the assessment of female factors contributing to infertility. Infertility is defined as 1 year of unprotected sexual intercourse without resultant pregnancy in a woman of childbearing age (15–44 years) (American College of Obstetricians & Gynecologists, 2011). HSG is a simple radiographic procedure that is relatively inexpensive. It is used to diagnose structural and functional defects, including fallopian tube blockage and polyps. Blockage of one or both fallopian tubes can inhibit reproduction. In some cases, HSG is therapeutic. Injection of the contrast media can dilate a narrowed fallopian tube (Al-Jaroudi, Aldughayvin, Alshamry, Alrashidi & Bahnessy, 2018; Bontrager & Lampignano, 2014).

HSG is contraindicated for pregnant women and for those with active infections of the reproductive tract (American College of Obstetricians & Gynecologists, 2011; Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016; Simpson, Beitia & Mester, 2006). The examination should be scheduled around the 7th to 10th day of the woman's menstrual cycle to avoid possibility of pregnancy (American College of Obstetricians & Gynecologists, 2011; Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). These days of the menstrual cycle precede ovulation, so there is a minimal risk of pregnancy. The patient should be provided a full explanation of the procedure by the health-care provider and possible complications reviewed. Informed consent should be obtained. In some cases, the physician or gynecologist who ordered the HSG may be present and may perform a pelvic examination before the HSG procedure.

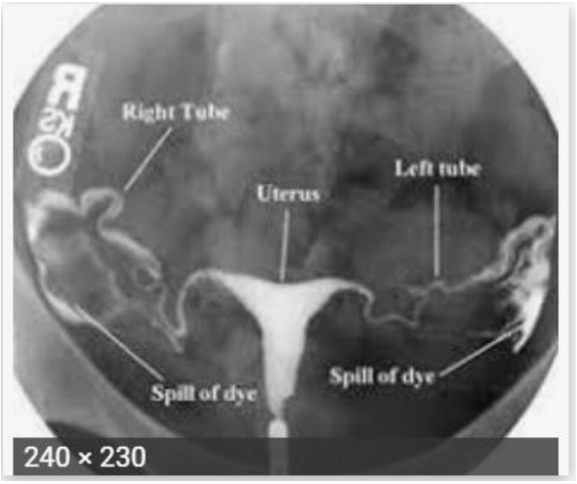

Figure 1. Open fallopian tubes (normal). https://www.google.com/imgres?imgurl=https%3A%2F%2Fi.pinimg.com%2F736x%2Fc8%2F40%2F94%2Fc8409466811ac0c366961c751d0bd6f0.jpg&imgrefurl=https%3A%2F%2Fwww.pinterest.com%2Fpin%2F789326272162645332%2F&docid=OgvIlriO2gmRGM&tbnid=d_33n0beJE3j8M%3A&vet=10ahUKEwj76OPL6cLeAhVGKuwKHefKBrgQMwhUKAIwAg..i&w=240&h=230&bih=522&biw=731&q=hysterosalpingogram&ved=0ahUKEwj76OPL6cLeAhVGKuwKHefKBrgQMwhUKAIwAg&iact=mrc&uact=8.

The patient may be instructed to complete a bowel prep, to remove stool and allow better visualization of pelvic structures (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). Often a sodium phosphate saline laxative enema is recommended to use before the procedure. The patient may be requested to skip a meal before the procedure. The patient may be advised to take a mild pain reliever before the HSG examination to decrease cramping discomfort (American College of Obstetricians & Gynecologists, 2011; Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016).

The major need for HSG examination is a radiography or fluoroscopy room, with a table capable to tilt a patient to the Trendelenburg position (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). The Trendelenburg position may be used to facilitate upward flow of contrast material into the female reproductive tract. The patient should empty her bladder before the procedure, remove underwear, and dress in a patient gown. The patient should be assisted in achieving the lithotomy position, and gynecologic foot rests may be attached to the table. If stirrups/footrests are not used, the patient bends her knees bilaterally and places her feet on the table, still assuming the lithotomy position. Other equipment and supplies needed for HSG are a vaginal speculum, water-soluble lubricating jelly, gauze, drapes, forceps, tenaculum, sterile gloves, antiseptic solution, a cervical cannula or balloon catheter, 10-mL syringes, and adequate, free-flowing liquid iodinated contrast medium, such as Omnipaque 300 (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016).

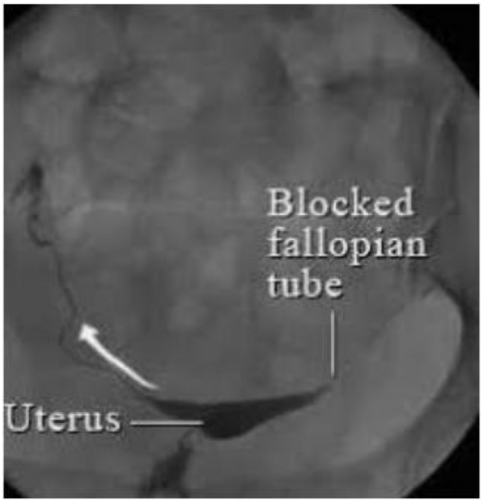

Figure 2. Blocked left fallopian tube (abnormal). https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwj76OPL6cLeAhVGKuwKHefKBrgQMwhcKAowCg&url=https%3A%2F%2Fwww.radconlittlerock.com%2Fservices%2Fdiagnostic-radiology%2Fflouroscopy%2Fhysterosalpingogram%2F&psig=AOvVaw1HoD38p0F_FEJXcjW2p1T2&ust=1541698766649763&ictx=3&uact=3.

After placement of the lubricated speculum in the vagina, the uterine cervix is identified and cleansed with antiseptic solution (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). The catheter attached to a syringe filled with contrast media is inserted into the cervix. To assist in placing the catheter in the cervical os, a tenaculum may be used to grasp the cervix to aid in catheter insertion. A scout radiograph image may be obtained to show the catheter in place before the contrast is injected. A marker is placed to show right or left side of the patient's body. The physician slowly injects contrast into the uterine cavity. Often, in a fractional dose method, 10 mL of contrast media is administered in fourths using the syringe, that is, 2.5 mL per injection. The capacity of the uterine cavity is approximately 5 mL. The uterus will fill first, followed by filling of the fallopian tubes and spillage of contrast into the peritoneal cavity if tubes are patent and open. Usually 10 mL of contrast media is sufficient to fill the uterus and both fallopian tubes and demonstrate spillage of contrast into the peritoneum bilaterally if both fallopian tubes are open and patent (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). The HSG images can also document blocked tubes, as shown in Figure 2. Figure 2 shows a patent right fallopian tube, outlined with contrast, and spillage from the distal end of the tube into the peritoneum. It shows a blocked left fallopian tube.

During the injection of the contrast material, a series of collimated images are taken while the uterine cavity and the fallopian tubes are filling with contrast (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). Additional image(s) may be taken to show spillage into the peritoneum from the ends of both fallopian tubes. The woman patient should lie motionless during the radiograph procedure. Decreasing client motion helps improve image quality, thus decreasing the need for repeat X-rays (Bushong, 2013; Carlton & Adler, 2013). Either conventional radiography or fluoroscopy may be used to obtain these images. If fluoroscopy is not used, a spot image radiograph may be taken after each fractional dose of contrast is injected to demonstrate uterine filling, tubal filling, and spillage of contrast into the peritoneum from both tubes. To deliver the least possible dose of radiation to the patient, fluoroscopy and imaging are kept to the minimum required to obtain a satisfactory examination.

Cannulating the cervix and injecting contrast media can be painful for the patient and can cause intense cramping sensations. Patients should be coached by the radiology team to avoid movement and hold their body motionless so that images can be obtained (Bushong, 2013; Carlton & Adler, 2013).

After the procedure, the cervical catheter or cannula is removed (Bontrager & Lampignano, 2014; Carver, Franceschi & Theis, 2016). The woman is assisted, as needed, out of the lithotomy position on the table. She may still be experiencing pain or cramping. She may be assisted off the table to a more comfortable chair or recliner to relax after the procedure or be directed to the dressing area or restroom. She should be provided with tissue to facilitate perineal cleansing and assistance, as needed, to dress herself. Although family members may be present to assist the patient, the patient can drive themselves home after the procedure. There is no restriction of activity after the procedure. The patient may note blood-tinged vaginal discharge or spotting of blood after the procedure. A pad can be used for this discharge. Tampons should be avoided. Heavy bleeding, fever, or foul-smelling discharge observed after the procedure should be reported to the physician (American College of Obstetricians & Gynecologists, 2011).

Diagnostic imaging with HSG is an integral part of infertility diagnosis and treatment for the infertile female client. Working together, the radiology department personnel can provide precise radiograph images with careful attention to minimizing radiation dose to the client. Results of the HSG examination are shared with the client and health-care provider and can guide the treatment plan for the infertile client. Through education and support, radiology nurses can help to make the experience of the client undergoing HSG examination in the radiology department less stressful and less frightening. Radiology nurses should become familiar with the examination techniques used, as well as patient education and support needed.

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