This is the second in a two-part series on this detailed case study. The general biographical information has been reprinted for quick review.

OVARIAN CYSTECTOMY AND BILATERAL TUBAL LIGATION

A CASE STUDY/PART II

VALERIE ROCHE, CST

General biographical information

This patient is a Caucasian woman, born October 15, 1960, who is divorced and lives in New York. Her religious affiliation is Catholic. She smoked two to three packs of cigarettes per week for 20 years and quit smoking in 1995. She drinks alcohol socially—approximately one drink daily and two to three drinks daily on weekends. The patient has three children, two of whom are living at home. She has a high school education and works in an office environment.

Operative procedure

Positioning

The patient was transported from the holding area to the operating room via the wheelchair by the surgical technologist and the circulating nurse. She was assisted onto the locked operating table from the locked wheelchair and was placed in the supine position. She was covered with a blanket but complained consistently that she was hot. When the anesthesia provider was ready, the patient was assisted to a sitting position with her back bent forward to receive the epidural and spinal anesthesia. (This process is discussed in the following section.)

She was returned to the supine position on the order from the anesthesia provider. A foam donut was provided to support her head. Both of her arms were extended on bilateral arm boards with padding and a towel underneath. She refused to have her arms strapped onto the arm boards. A pulse oximeter was attached to her right index finger, and a grounding pad for the electrosurgical unit (ESU) was placed on her upper left thigh with the setting at 30/30. The placement site for the grounding pad was dry and the skin intact. A blood pressure cuff was placed on her upper right arm, and three electrocardiogram leads were affixed to her body. Two leads were placed bilaterally on the upper anterior chest and on the left lateral chest wall.

A safety strap was secured across the patient's thighs, approximately two inches above her knees. (She did not protest this strap because she could not feel it.) Venodyne pressure cuffs, sequential pneumatic pressure sleeves, were placed around her lower legs between her ankles and knees, and set at 40 mmHg.

The surgical technologist was at her side during the positioning process. A #16 French Foley catheter with a 5 cc balloon, 10 ml of sterile water and a urinary drainage system was inserted into the urethra while the patient was in a frog leg position.

Anesthesia

The patient adamantly demanded that her pain be controlled without loss of consciousness. She received regional anesthesia, utilizing a subarachnoid block (spinal). During the spinal, two drugs were administered, Bupivacaine hydrochloride (0.75%) and Fentanyl. Bupivacaine is an amino amide local anesthetic that provides good relaxation and is long acting. Fentanyl is an intravenous opioid anesthetic agent, a potent narcotic analgesic and a respiratory depressant.[7] Morphine was also administered. It is an opiate analgesic that depresses pain impulse transmission at the spinal cord level by interacting with opiate receptors.[4]

A member of the staff braced the patient and helped maintain her in the desired position, sitting laterally on the operating table with her back curled forward and her feet resting on a stool. The circulating nurse provided emotional support by constantly reassuring her. Her chin was lowered, and her spine was flexed. The equipment included a fenestrated drape, anesthetic agents, dextrose (to make the drug heavier than the cerebrospinal fluid), antiseptic solution, needles and syringes.

The lower lumbar area was prepped (cleansed) and draped with the fenestrated sheet. Prior to placement of the spinal needle, a small amount of local anesthetic (1% Lidocaine plain) was placed into the subcutaneous tissues along the intended needle path to maximize patient comfort and cooperation. Access to the subarachnoid space was achieved by the insertion of a fine-gauge, 3-

TABLE 1 **Instruments**

HOSPITAL MAJOR TRAY

Description	*Quantity*
Straight point	2
Kelly	16
Allis	6
Curved points	12
Kocher	6
Babcock	4
Mixter	4
Peanut	4
Sponge sticks	2
Short needle holder	4
Medium needle holder	2
Long needle holder	2
Towel Clip	4
#3 Knife handle	2
#7 knife handle	1
Forceps	
Regular smooth	2
Medium smooth	2
Hayes Martin	2
Short tooth	2
Medium tooth	2
Long tooth	2
Adson tooth	2
Ring	1
Scissors	
Straight Mayo	1
Curved Mayo	1
Long Metzenbaum	1
Poole suction	2
Retractors	
Army/Navy	2
Vein	2
Wide Deaver	2
Narrow Deaver	2
Harrington	2
Malleable	2

HOSPITAL HYSTERECTOMY TRAY

Description	*Quantity*
Kelly long	4
Kocher long curved	4
Kocher long straight	4
Allis long	4
Phaneuf curved	4
Heaney	2
Babcock long	4
Scissors	
Mayo curved long	1
Mayo straight long	1
Nelson	1
Tenaculum short	2
Tenaculum long	1
Uterine elevator	1
Forceps tooth long	1
Sullivan O'Connor Retractor	1
Retractor blades	3
Retractor screws	2
Needle holder long	1

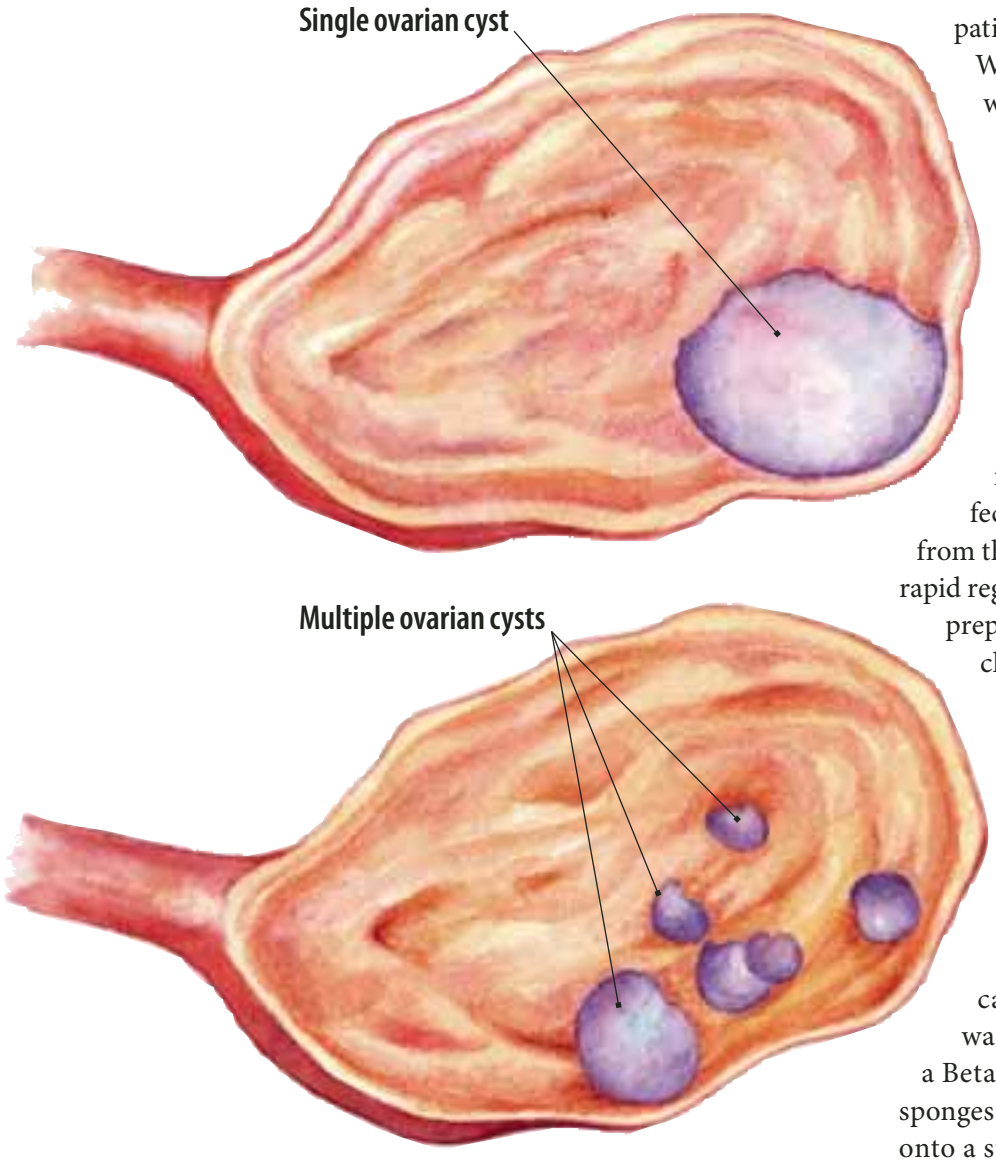

FIGURE 1
Single and multiple ovarian cysts

inch spinal needle through the tissues of the l3-l4 disk spaces of the vertebral column. Correct needle placement was confirmed by the presence of cerebrospinal fluid in the needle hub when the needle stylet was removed. The syringe containing the anesthetic drugs was connected to the spinal needle, making sure that air was not allowed to enter the system. The agent was slowly injected and the needle was removed.[3] The spread of anesthetic and duration of action are influenced by the concentration and volume of the agent injected and the rate of injection.[7]

After the injection, the anesthesia provider tested the level of anesthesia by touching the patient in various places on her lower limbs. When he was satisfied that the anesthetics were effective, the patient was returned to the supine position. She was asked to relax, and the team turned her body and lifted her legs onto the operating table.

Prepping and draping

To prevent bacteria on the skin surfaces from entering the surgical wound, the skin area at and around the proposed incision site must be cleaned and disinfected. The object is to remove microbes from the skin in the shortest time and prevent rapid regrowth of microbes on the skin.[11] When preparing the patient's skin for surgery, the cleanest area is done first.[11]

An antimicrobial agent was applied using sponges, and sterile gloves were worn. Lather was removed with a dry, sterile towel. In this case, the patient's skin was prepped after the spinal anesthesia had been administered by the anesthesia provider. The circulating nurse inserted a Bard Foley catheter. A topical, antimicrobial paint was carefully applied by the surgeon using a Betadine® paint solution on 4x4 RAY-TEC sponges folded into paint sponges and clamped onto a sponge stick. The prep began approximately 3 cm below the umbilicus to 4 cm above the symphysis pubis (ie the incision line) and continued outward in rectangular-shaped strokes to an area that encompassed the nipple line to midthigh, and bedside to bedside. The pelvic area was done last.

The sterile drapes were placed on the patient by the surgeon and the surgical technologist. A sterile sheet was placed below the incision site down toward the legs and covered the patient and the table. Another sterile sheet was placed on the patient above the incision site toward the head and was attached with the assistance of the anesthesia provider to the intravenous poles at either side of the bed. Four sterile towels were placed outlining the incision site, and secured

with four towel clips. A fenestrated laparotomy sheet was placed over the other drapes with the fenestration placed to give adequate exposure to the incision site.

Overview of the procedures

This case was booked as an exploratory laparotomy, ovarian cystectomy and bilateral tubal ligation, with a possible oophorectomy and possible total abdominal hysterectomy bilateral salpingo-oophorectomy. If an ovarian mass is larger than 6 cm or it persists without diminution in size for longer that three months, exploration should be done.[12] Instrumentation for all procedures is shown in Table 1.

Exploratory laparotomy

An opening made through the abdominal wall into the peritoneal cavity is called a laparotomy.[11] In this case, the exploration is a visual exam of internal organs for diagnosis, which was performed in addition to the two other planned procedures. Skin and subcutaneous tissue is incised and blood vessels are occluded. Fascia is then incised, the underlying muscles are retracted or transected, and the peritoneum is opened. The abdomen is then explored.[13]

Oophorocystectomy

This is the removal of an ovarian cyst. The cyst is usually enucleated if the ovarian tumor is recognized as benign, (in this case, intraoperatively, by a confirmed pathology report), and only the visibly diseased portions of the adnexa are removed.[11]

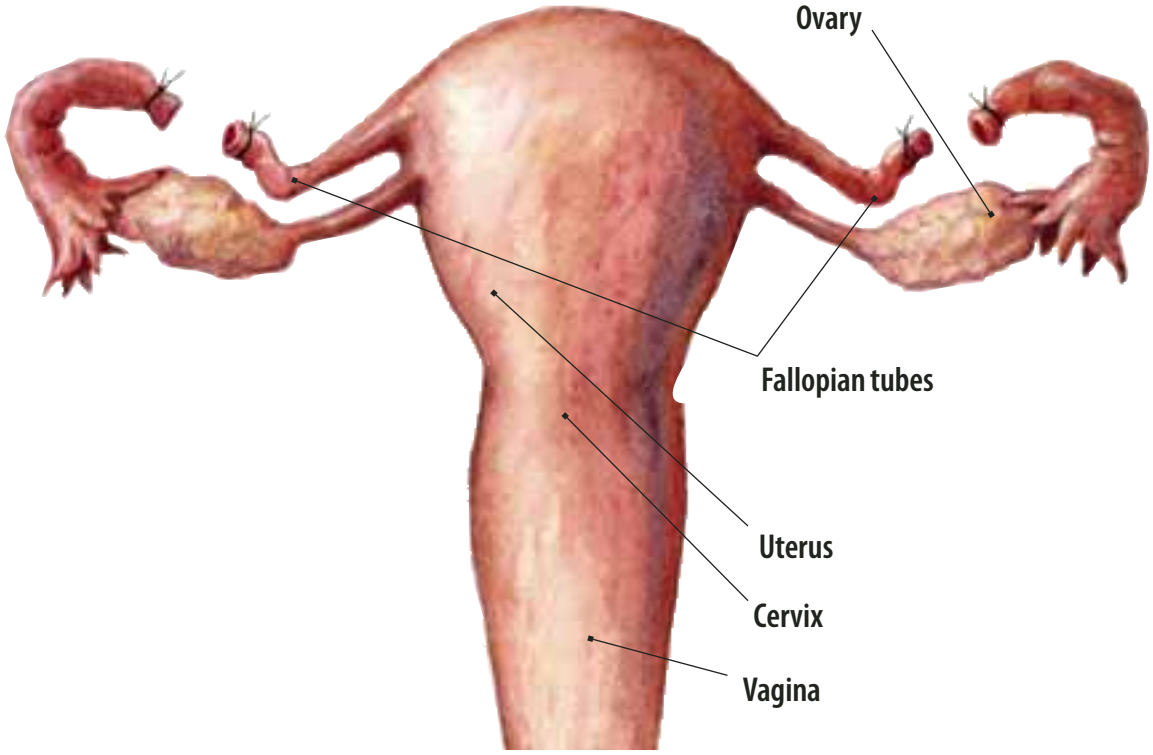

FIGURE 2

Tubal ligation

Benign ovarian tumors may be solid or cystic. In the 30- to 50-year age group, 80% of ovarian growths are benign. Serous and mucinous cystadenomas account for 19% of benign ovarian growths (excluding follicular and corpus luteum cysts). The most frequent symptoms of benign ovarian growths are slow abdominal enlargement, pain and tenderness from torsion of the pedicle, and interference with the blood supply. Most commonly, these growths are asymptomatic and discovered on a routine pelvic exam.

The treatment of benign ovarian growths is primarily surgical removal with conservation of all possible normal ovarian tissue.[12] (Figure 1)

After the peritoneal cavity is entered, the intestines are protected by laparotomy pads. Benign ovarian cysts are treated by local incision with preservation of the ovary. A frozen section confirmed the benign nature of the cyst; therefore, removal of only the cyst was justified and normal tissue preserved.[7] In this case, the patient had chronic pelvic pain and was diagnosed with a benign serous cyst that was removed, preserving her ovary.

Bilateral tubal ligation (salpingectomy)

Tubal ligation is considered a permanent method of reproductive sterilization because reversal cannot be guaranteed. The surgical technique involves removing a portion of the middle part of the fallopian tube on each side for pathologic confirmation and ligation of both the distal and proximal ends to prevent the cut ends from growing together. Tubal ligation by open abdominal approach was done in this case in conjunction with another procedure, an oophorocystectomy. Each tube was tied with suture material and a section was removed. This is called the Pomeroy technique of ligation. It is reliable, provides a surgical specimen of each tube, and causes minimal tubal destruction.[7] (Figure 2)

Detailed description of the operative procedure

A midline incision was made with a #3 knife handle and a #10 blade. Hemostats were used to control bleeding vessels. Clamped vessels were electrocoagulated with the ESU. The wound edges were retracted. The fascia was incised superiorly and inferiorly with Mayo scissors and the ESU. With the ESU, the external oblique muscle was split the length of the incision. Bleeding vessels were controlled with hemostats. The external oblique muscle was retracted, and the internal oblique muscle and transverse muscles were split, parallel to the fibers, up to the rectus sheath with Metzenbaum scissors. These muscles were then retracted. The peritoneum was identified and entered, incised longitudinally with Metzenbaum scissors, keeping the bladder and the bowel under direct visualization at all times. Laparotomy pads and suction were used as needed. The peritoneum was retracted for the exploration with large Richardson retractors.

Exploration of the abdomen revealed a left ovarian cyst approximately 7-8 cm in the longest diameter. The uterus and right adnexa were within normal limits. Exploration revealed normal liver, spleen, stomach, bowel and diaphragm.[11]

The left ovarian cyst was elevated out of the operative field and was removed using two Kelly clamps below the left ovarian cyst. The pedicle was sutured with #0 DEXON sutures and free tied with a #0 DEXON free tie.

Attention was turned to the fallopian tubes, which were identified from the cornual region to the fimbria. The right tube was grasped with an Allis clamp in the midportion. The loop was grabbed with a #2-0 plain free tie which was doubly tied. The portion of the right tube above the tie was removed with Metzenbaum scissors. The endosalpinx was coagulated and the portion of the tube was sent to pathology. A similar procedure was done to the left tube.

Careful inspection of both adnexal regions showed no sign of bleeding. After copious irrigation with 0.9% sodium chloride solution, inspec-

TABLE 2 **Patient's Chart**

Procedure Start Time	8:20 am
Procedure End Time	9:35 am
Surgery Start Time	8:40 am
Surgery End Time	9:25 am
Estimated Blood Loss	15 ml
Post-operative Urine	400 ml, clear, yellow

TABLE 3 **Postoperative diagnostic studies**

Test	*Postoperative*	*Preoperative*	*Normal range*	*Notes*
WBC	12,600/mm^3	10,200/mm^3	3,500-10,000/mm^3	Elevation may be due to patient's psychological state/stress from surgery, or antibiotic influence.[6]
RBC	4.6 million/mm^3	4.85 million/mm^3	4.5-5.3 million/mm^3	
Hb	10.5 g/dl	14.4 g/dl	12-16g/dl	Drop may be due to blood loss during surgery (15 ml) and possible antibiotic influence. Receiving intravenous fluid can cause hemodilution.[6]
Hct	32.8%	41.9%	35-47%	Drop may be due to blood loss during surgery and antibiotic influence.[6]
MCV	71.8 FL	86.3 FL	85-95 FL	Drop may be due to blood loss during surgery.[6]
MCH	23 pg	29.7 pg	27-32 pg	Drop may be due to blood loss during surgery.[6]
MCHC	32.0 g/dl	34.3 g/dl	31-36 g/dl	Drop may be due to blood loss during surgery.[6]
RDW	28%	12%	11.3%-13.5%	Elevation may be due to increased changes in red blood cells due to blood loss during surgery.
PLT	416,000/mm^3	375,000/mm^3	150,000-400,000/mm^3	Elevation may be due to the trauma of surgery.[6]
Calcium	8.3 mg/dl	9.1 mg/dl	8.5-10.5 mg/dl	Drop may signal malabsorption of calcium from the gastrointestinal track due to a peptic ulcer. Antibiotic influence may also be a factor.
Glucose	128 mg/dl	169 mg/dl	70-110 mg/dl	Patient is being treated for diabetes mellitus. Postoperative levels are higher than normal, but lower than preoperative levels. Anesthetic drugs can also raise glucose levels.[6]
BUN	5 mg/dl	9 mg/dl	7-20 mg/dl	Drop could be due to intravenous fluids during surgery, or lack of food.[6]
Creatinine	.8 mg/dl	.7 mg/dl	.5-1.5 mg/dl	
Sodium	136 mEq/l	135 mEq/l	135-147 mEq/l	
Potassium	4.0 mEq/l	4.0 mEq/l	3.8-5.0 mEq/l	
Chloride	102 mEq/l	101 mEq/l	100-108 mEq/l	
Carbon Dioxide	30 mEq/l	27 mEq/l	24-32 mEq/l	

tion showed no signs of bleeding. The results of the frozen section came back, indicating that the finding was serous benign ovarian cyst.

Two Kellys were used to reapproximate the peritoneal edges and the internal oblique muscles. Fascia and peritoneum were reapproximated and closed with a #0 MAXON tapered needle and a running suture. Muscle tissue was reapproximated. The external oblique fascia was closed with interrupted sutures. Retraction was done with Richardson retractors as the various layers were closed. The subcutaneous tissue was evaluated for any bleeding. Skin was reapproximated with staples (35W), and the incision was covered with Adaptic® and 4x4 dressing sponges. (Table 2)

The patient, who was awake during the procedure, complained constantly about being hot and thirsty. The surgical technologist gave her ice chips to alleviate her discomfort.

TABLE 4 **Initial Vital Signs**

Oxygen Saturation Rate	98% (a nasal cannula was not used)
Heart Rate	95 beats per minute
Blood Pressure	150/89 mm/Hg
Respiration	18 breaths per minute
Temperature	96.5 F

Pathology report

Specimen #1: left ovarian cyst

The specimen was received fresh for intraoperative consultation. A frozen section was ordered intraoperatively. This is a rapid test which may be utilized while the patient is still anesthetized. The surgeon's subsequent action is influenced by the results received.[1] There was reasonable assurance that the cyst was benign, and the surgeon removed only the cyst and preserved the normal ovarian tissue.

The specimen consisted of a cystic mass, measuring 8.1 x 5.5 x 3.5 cm and weighing 116 g. The outer surface was smooth, a pink-tan color, and somewhat transparent. Attached to the specimen was a portion of pink-tan tubular soft tissue consistent with a segment of fallopian tube, measuring 3.1 x 0.6 x 0.4 cm. When the specimen was opened, it contained serous fluid with a pale-tan, smooth inner lining. No abnormal areas were identified. The representative section was labeled "benign serous," and was identified as a serous cystadenofibroma (a cyst filled with cuboidal epithelial cells). A fibroma is a fibrous, encapsulated connective tissue tumor, irregular in shape, that grows slowly and has a firm consistency.[1] The most significant finding was that it was benign.

Specimen #2: right segment of fallopian tube

This specimen was received in saline solution and consisted of a segment of tubular structure measuring 0.7 cm in length and 0.6 cm in diameter. The serosal surface was pink-white in color and had a smooth texture. Sectioning revealed a pinpoint lumen.

Specimen #3: left segment of fallopian tube

This specimen was received in saline solution and consisted of a segment of a cylindrical structure measuring 0.6 cm in length and 0.6 cm in diameter. The serosal surface was a pink-tan color and had a smooth texture.

The diagnoses for specimens #2 and #3 were portions of fallopian tubes: cylindrical, solid, fibromuscular tissue; cross and long sections.

Postoperative diagnostic studies

Laboratory tests shown in Table 3 were performed postoperatively on January 29, 2003. For comparison, the patient's preoperative levels for each test are repeated.

Medications ordered

Postoperative orders included sips of water, an intravenous line of Ringer's lactate of 125 ml per

hour, and the following medications: a) Zofran® (an antiemetic): 4 mg intravenously every six hours as needed;[4] and b) Motrin® (ibuprofen): This is an analgesic, anti-inflammatory and antipyretic. Postoperative orders were 400 mg, taken orally as needed every six hours.[4]

Postoperative visits with the patient

Postoperative recovery unit

The patient was rolled onto a stretcher in supine position with a Davis roller and was transported to the recovery area accompanied by the anesthesia provider, the circulating nurse and surgical technologist. The anesthesia provider gave a detailed status report to the recovery room nurse regarding the anesthesia administered, the patient's allergies and the procedure. The anesthesia provider attached a pulse oximeter to the patient's left index finger, a blood pressure cuff to the right upper arm, and three electrocardiogram leads to the upper chest wall and the lateral wall (Table 4). The Foley catheter remained in place as well as the Venodyne stockings. The patient's intravenous line was still intact, and the surgical technologist did not inspect the dressing, although it appeared dry.

The patient complained that she was nauseous. She agreed to take medication after three attempts by the nurse to convince her, and she was given 4 mg of Zofran® (ondansetron) intravenously. This agent is an antiemetic that prevents nausea and vomiting by blocking seratonin.[4] Within 10 minutes, the patient had fallen asleep.

First postoperative visit

The surgical technologist's initial visit to the patient to the floor of the hospital gynecology unit (10 am on January 29, 2003) was canceled by the supervising floor nurse, because the patient was too sick. The surgical technologist returned at 11:30 the same morning, (26 hours postoperatively) and saw the patient. The patient was in the supine position in bed with the back of the bed raised. She was awake.

She stated that she had not voided. According to the floor nurse, her Foley catheter was scheduled to be removed later that day. The urine in the drainage bag was yellow and clear. The patient said that she did not feel well. She had been vomiting throughout the night (until 10 am that morning), but had subsequently kept down her breakfast and water.

The patient expressed anger at her anesthesia provider. She was walking and stated that she had no pain or discomfort from the incision, which appeared to be dry and intact. The sequential stockings were not on her legs. Her only complaint was that the antinausea medication had not worked. The patient asked the floor nurse to assist her in taking a bath, and the surgical technologist left.

Second postoperative visit

The surgical technologist arrived on the floor at 11 am on January 30, 2003. The patient was sitting on the bed, dressed to go home. The floor nurse was reviewing her doctor's postoperative orders and home care. She seemed in much better spirits. She stated that she felt no pain or discomfort. She had voided, had a bowel movement, and was eating normally. Her color was improved. The surgical technologist wished her well.

Discharge instructions

Orders included a return to a regular diet, a check-up with the surgeon after one week, no strenuous activity, and no coitus for six weeks. Postoperatively, the patient did remarkably well.

Prognosis

The patient is expected to recover fully from her surgical procedure. There were no complications from the surgery, and she is fundamentally in good physical condition and health.

About the author

Valerie Roche, CST, is a surgical technologist at North Shore University Hospital in Syosset, New York. She has a bachelor's degree from Columbia University and an MBA from Cornell Uni-

versity. She had a successful business career in the securities industry prior to returning to Nassau Community College for her AAS in surgical technology.

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Figure references

- Figures 1 and 2 adapted from: Longe JL, Blanchfield DS. *The Gale Encyclopedia of Medicine,* 2nd ed. Farmington Hills: Gale, 2002: 2446 and 3398.

Editor's note: The surgical technologist (author) explained to the patient that she was doing a report on her case and received permission to visit her and follow her progress.

Did You Know? Valerie Roche, CST

The first successful oophorectomy was in 1809 by Ephraim McDowell, who never completed his medical training, but is still considered the father of oophorectomy. McDowell operated on Jane Todd Crawford (a cousin of Abraham Lincoln's wife) who was 45 years old at the time. He diagnosed an enlarged ovary as the cause of Crawford's enlarged abdomen and removed her ovary, without anesthesia or today's antiseptics, in 25 minutes. He removed 22 pounds of fluid and ovarian tumor, and the patient was walking in five days. She lived for three more decades.

McMahon CP. Ephraim McDowell and the Origins of Oophorectomy. *NC Medical Journal.* 2000;61:401-402.