

CASE REPORT

Resection of a 303.2-Pound Ovarian Tumor

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A woman with a 303.2-pound ovarian mass is presented. She had been bedridden for the previous 2 years and housebound for 6 years due to the enlarging mass. Psychological factors enabling this patient to remain home and sabotage attempts of her family to obtain help must be considered and dealt with while obtaining preoperative consultation with each of the services ultimately to be involved in the patient's care. Psychiatric, pulmonary, nutritional, cardiac, endocrinologic, reconstructive surgery, anesthesia, and operating room nursing assessment and advice should be sought. Despite the large size, there is a one-third chance of finding a malignancy, suggesting that all of these large masses should be removed intact whenever possible. An elliptical transverse incision from iliac crest to iliac crest offers the best preservation of abdominal wall anatomy and function. Invasive cardiac and pulmonary monitoring should continue through the operation and afterward, as severe cardiopulmonary/hemodynamic compromise is possible. Long-term psychiatric follow-up is needed as the dramatic anatomic restoration is not always accompanied by a similar psychologic restoration. © 1994 Academic Press, Inc.

INTRODUCTION

Massive ovarian tumors are rare. There have been case reports in both the medical and the lay press of surgical extirpation of simple fluid-filled cysts weighing as much as 300 lbs [1]; however, the following describes the removal of a 303.2-pound (134.7 kg) right complex, solid, and cystic ovarian mass, and includes a review of the literature with regard to the cancer potential of these large masses.

CASE REPORT

A 35-year-old single female was admitted to the psychiatric/medical unit of Stanford University Hospital for evaluation of massive abdominal distention on October 14, 1991. The patient had a past medical history of morbid

obesity with a reported 80-pound weight loss while on a commercial weight reduction program in 1984. The following year, she noted a gradual increase in the size of her lower abdomen with a distinctly different distribution of weight concentrated in her lower abdomen. This increased in size over the next 8 years until the patient became reclusive, and ultimately nonambulatory for the 30 months prior to admission. Her family performed her daily hygiene and assisted her in the 30-min regimented task of getting up to the bedside commode a few feet away, twice daily. The patient had an in-home evaluation by a psychiatrist in 1988 and was diagnosed as having agoraphobia with panic attacks, atypical depression, pathologic obesity, dependent personality disorder, life circumstance problems, and participation in a family codependency system which allowed the patient to progress into this unusual physical and psychologic state.

Physical exam revealed a 34-year-old woman lying comfortably on her left side on two hospital beds. She was alert, entirely oriented, and appropriate and pleasant in demeanor. The patient reported having a good appetite and regular stool habits. Her menstrual periods had been regular since age 11 with a duration of 5 days and an interval of approximately 30 days. Past surgical history was negative. The exam was essentially normal except that the abdomen contained an immense mass. The skin overlying the mass demonstrated large subcutaneous vessels coursing from the inferior epigastric region to the central umbilical region with palpable pulses. Her vulva, vagina, and cervix were grossly normal. The hymen barely admitted two fingers. A pap smear was normal. The extremities were without clubbing, cyanosis, or edema. Low-dose heparin prophylaxis was initiated using 5000 units subcutaneously every 8 hr.

Bedside abdominal ultrasound revealed a thick-walled multicystic and solid ovarian tumor of indeterminate side

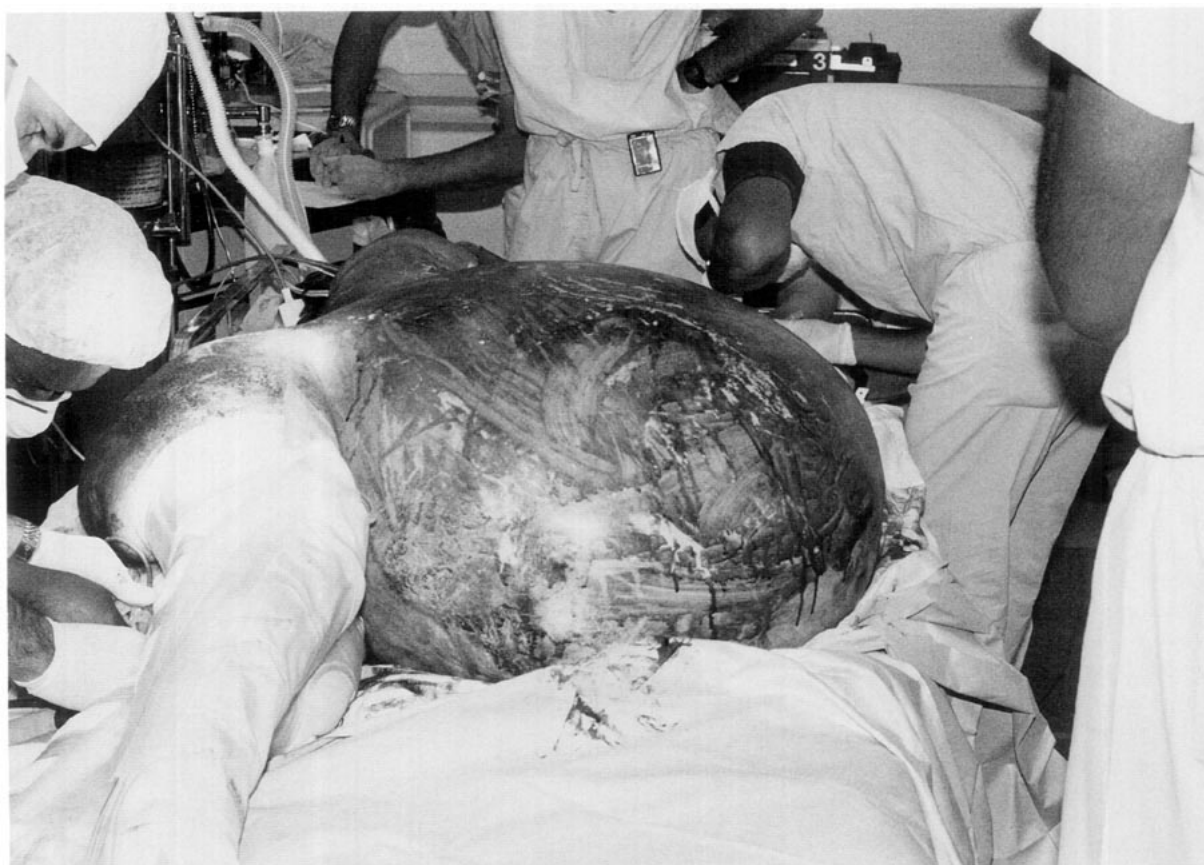


FIG. 1. The patient is laying on her left side on a sterile draped bed and has had an initial prep with Betadine.

of origin. The thick septa with multiple cavities, none greater than 10 cm in diameter, were noted to be highly vascular but the entire depth of the mass could not be visualized. Transvaginal ultrasonography to determine the side of origin was not possible secondary to the patient's narrow vagina. Pulmonary function tests were normal.

The patient had verbalized fears of what her family and society would expect from her if this mass were to be removed. She was also fearful of dying during the removal of the mass. An interdisciplinary meeting was held initially with the Family Practice team, and members of the departments of Psychiatry, Anesthesiology, and Reconstructive Surgery. Members of each team met with the patient daily for 7 days and supported the patient in her ultimate decision to have the mass removed.

On the assigned day the patient was taken to the operating room on one hospital bed. Sterile prep was undertaken with the patient still reclining on her bed, painting the right upper side of her body with Betadine from her shoulders to her ankles. The patient was then asked to stand for the few minutes she could tolerate, while the left side and underside of her body were prepped with Betadine and the hospital bed was fully draped with

sterile sheets (Fig. 1) in left lateral position. Antiem-bolism stockings and a sequential compression device were then applied. The patient was successfully intubated in the left lateral decubitus position after general anesthesia was induced.

An elliptical incision extended from the right anterior superior iliac crest, inferiorly over the symphysis pubis, and superiorly over the mass, transecting all the muscular layers of the abdominal wall (Fig. 2). Dense adhesions from the distal half of the ovarian mass to the parietal peritoneum of the anterior wall were lysed. The mass was kept moisturized with saline and covered with laparotomy pads to prevent incidental rupture. The 8-cm diameter infundibulopelvic ligament was identified and sequentially clamped, cut, and tied. A gurney had been draped in sterile fashion and moved immediately adjacent to the left side of the patient's hospital bed and locked firmly in place. The mass was then gently rolled away from the patient onto the gurney without rupture of any of the cystic compartments (Fig. 3).

The patient was subsequently turned to the supine position for resection of the remainder of excess abdominal wall continuing both superior and inferior incisions to the

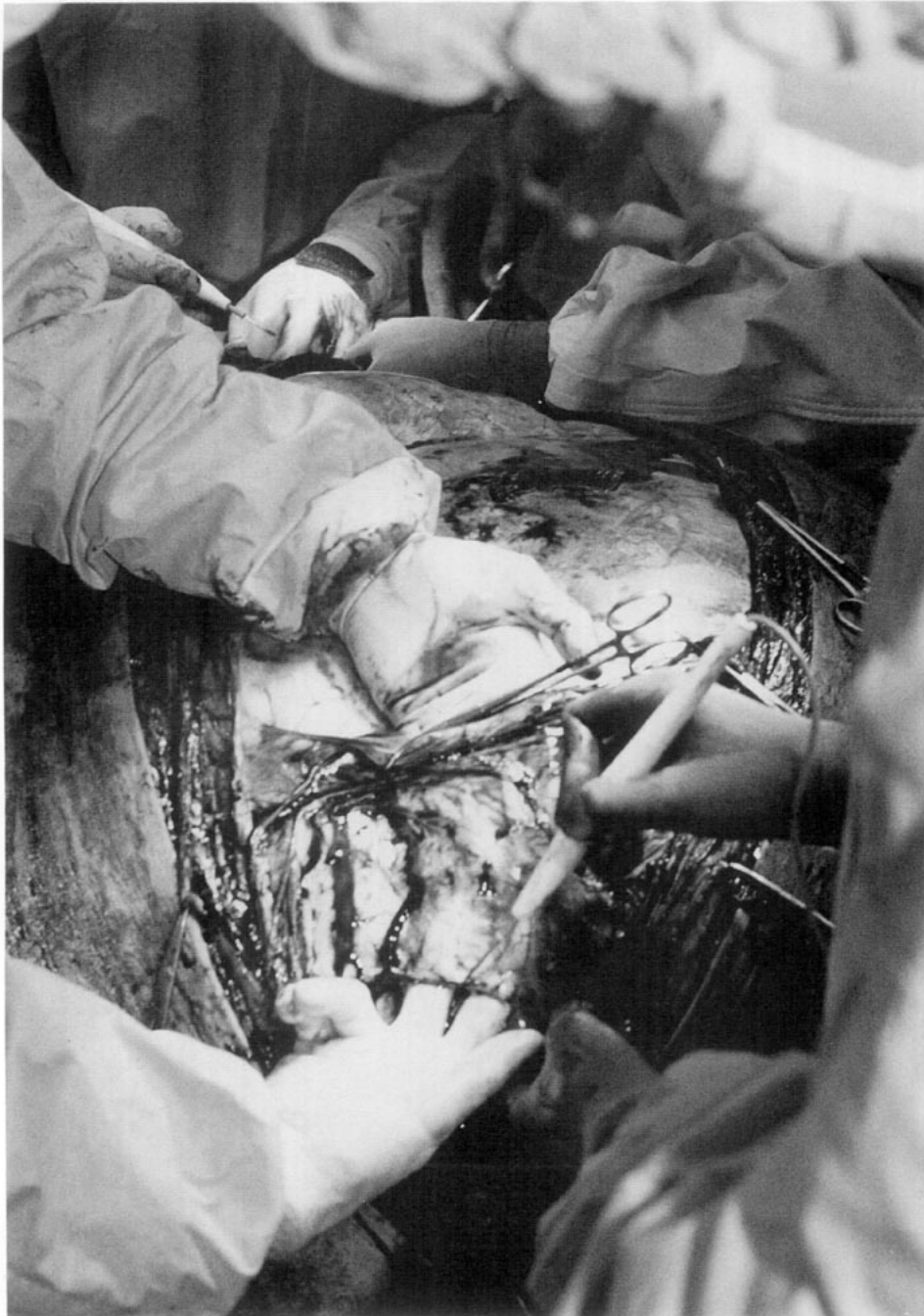


FIG. 2. An elliptical incision was made through all layers of skin starting at the left anterior superior iliac crest and extending both inferiorly and superiorly over the abdomen, exposing the mass.

left anterior superior iliac crest. The elliptical segment of excised skin measured 3 ft in vertical dimension by 5 ft horizontally, and weighed 15 lbs (6.8 kg).

The mass was weighed on the autopsy scales in the Department of Pathology: 303 lbs (134.7 kg). Frozen section of the massive ovarian tumor revealed benign mu-

cinous epithelium and dermoid elements. The final pathology report confirmed the mass to be a mucinous cystadenoma with benign teratoma components including gastrointestinal mucosa and thyroid elements.

Estimated blood loss was 1000 cc, which was largely due to the abdominal wall dissection. The patient received

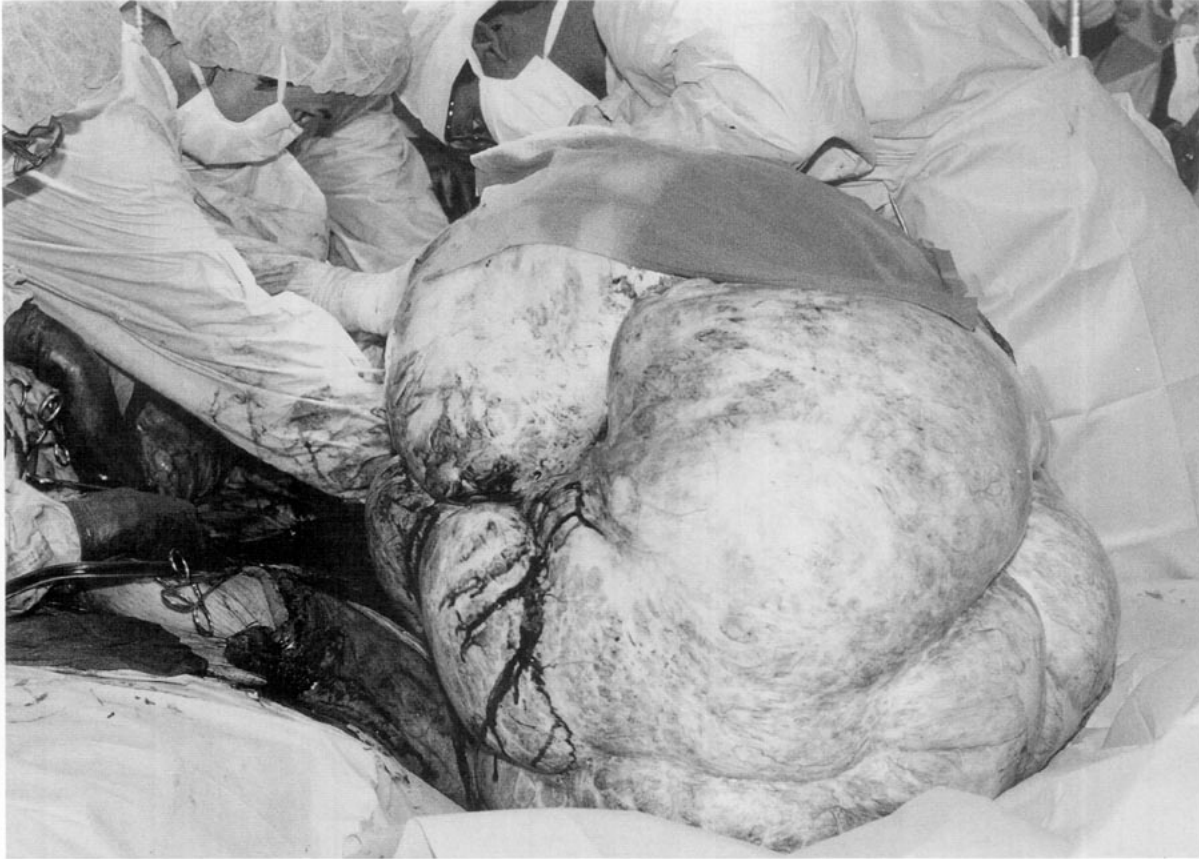


FIG. 3. Once freed of all adhesions to the parietal peritoneum, with infundibulopelvic vessels ligated, the mass was rolled intact onto a sterile draped gurney held adjacent to the patient's bed.

2 units of packed red blood cells intraoperatively and maintained a normal blood pressure throughout.

The patient was extubated 3 hr later in the ICU after her lung function and weaning parameters were reported as normal. She was transferred from the ICU to a regular postoperative room the next morning and began to ambulate on Postoperative Day 2. Physical therapy had been consulted to supervise her ambulation and to increase the range of motion of her legs. On Postoperative Day 4 the patient was transferred back to the psychiatric/medical unit where physical therapy and psychotherapy were continued. She remained in the hospital for another 2 weeks to continue her physical and psychiatric therapy. The wound demonstrated primary union and the subcutaneous drain was removed approximately 10 days after the surgery.

Once discharged from the hospital, the patient was seen every 3 months. At 22 months after her surgery the patient reported having visited the local shopping mall a few times but had not begun to consider looking for a job, reporting that she was too busy with all of her medical appointments. Her family reported she was assisting with only a few of the household chores and seemed still lim-

ited by all of the same psychiatric processes which allowed the mass to progress to such a large size. She continues in psychiatric, physical, and occupational therapy at this writing.

DISCUSSION

Such large tumors have previously been reported in many articles prior to 1929 with 9 tumors weighing between 200 and 300 pounds, 87 tumors weighing greater than 100 pounds, and 203 tumors weighing between 50 and 100 pounds [1-5]. In 1906, Spohn reported a 43-year-old woman confined on her side with a massive simple abdominal cyst which was preoperatively drained over 7 days of 30 gallons of gelatinous fluid. "The thickened sac, removed with difficulty on account of adhesions, weighed forty pounds, giving the tumor, as near as I could estimate, a total weight of 328 pounds" [6]. The largest complex tumor removed intact prior to our patient's 303-lb mass was reported in 1954 by Eames *et al.* weighing 184 lbs [7].

The report by Dotters *et al.* [2] demonstrates the decreasing incidence of masses this size since the turn of

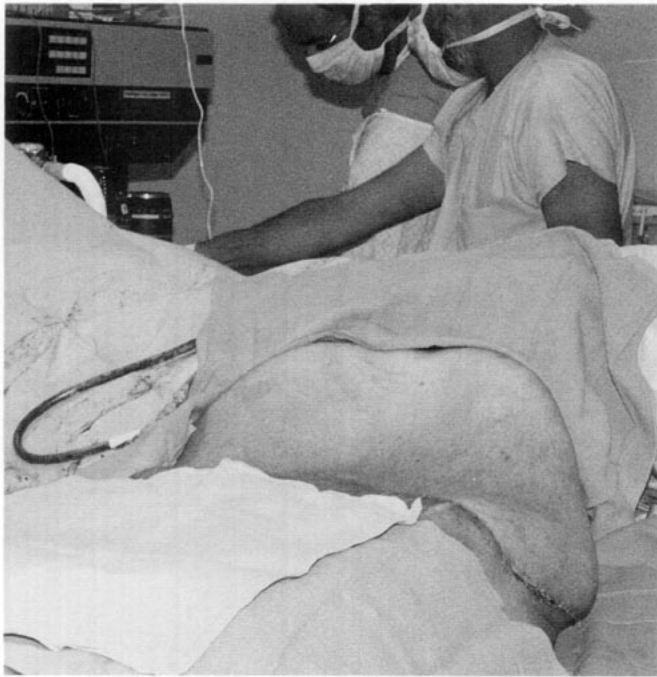


FIG. 4. At the completion of the closure, the flaring of the ribs secondary to chronic distension of costochondral junctions by the tumor mass can be seen.

the century and attributes this change to greater health awareness and easier access to medical care. From 1946 to 1970 Beacham *et al.* were able to find only 16 reports of large ovarian tumors [3]. Dotters added 10 more recent cases in 1988, including their own patient with an 82-pound mass. In her series of patients, 8/26 (30%) had malignant elements. There have been seven reported ovarian tumors greater than 50 pounds which contained frankly invasive serous, mucinous, or sarcomatous elements (Table 1). Follow-up on these patients who were most often apparent Stage IA is scant, with the focus of most articles being on the immediate surgical management of the tumors rather than long-term follow-up. Patients with low malignant potential massive ovarian tumors (Table 2) age from 30 to 65 years, median 31 years,

while those with frankly invasive large ovarian tumors were ages 44 to 68, median 54 years.

Many authors inserted trochars either percutaneously in the preoperative setting or through the cyst wall intraoperatively to decompress the tumor, facilitate its removal, and minimize vascular pressure changes [7,8,11,13,14]. Intraoperative or preoperative drainage of complex masses can result in spillage of tumor cells into the abdominal cavity or drain site with potential for subsequent seeding and can also cause hemorrhage into the cystic compartments of the mass itself or into the abdominal cavity, as well as leaking of cyst fluid into the peritoneal cavity with sudden pulmonary edema as Drife *et al.* noted [10]. Preoperative or intraoperative drainage of a mass should be reserved for patients *in extremis* with cardiovascular or respiratory compromise due to compression [3,10,11]. Given the possibility of a malignant element within a complex mass, all other patients undergoing elective resection of complex masses should have every attempt at removal intact [1,2,15]. Drainage of a large simple cyst can be performed preoperatively or intraoperatively, if necessary, only after sonographic evidence of mural papillation or solid element is absent.

Pulmonary complications occurred in many patients whose large masses were removed [2,8,10,15]. Preoperative teaching of use of the incentive spirometer and evaluation of pulmonary function should be performed, as respiratory dysfunction can result once the mass is removed due to sudden relaxation of the chronically distended, flaccid abdominal and diaphragmatic muscles. Most notable is a decreased functional residual capacity as a result of an attenuated diaphragm muscle, and permanent flaring of the thorax secondary to chronic mass effect on the costochondral junctions. Delayed extubation only after ascertainment of weaning parameters has been recommended [2,8] as some patients have required reintubation for ventilatory failure likely secondary to diaphragm muscle flaccidity [10]. Bronchopneumonia has also been described in these patients as a result of poor ability to cough and take deep breaths [10].

An arterial line should be inserted preoperatively for

TABLE 1
Malignant Massive Ovarian Tumors

Source	Age	Incision	Size (lbs)	Pathology	Stage	Intact	Follow-up
Dotters (2)	54	Verticle ellipse	82	G1 mucinous	IA	Yes	NED, 16 months
Eames (7)	44	Paramedian	184	Seromucinous adeno-CA	IA	Yes	Discharged NED
Matory (8)	65	Transverse ellipse	113	G2 Mucinous and sarcoma	—	No	NED, 6 months
	53	Transverse	51	Fibrous adenocarcinoma	—	Yes	NED, 6 months
Symmonds (1)	58	Transverse	175	G1 papillary mucinous	IC	No	Surgical death POD 13
Hunter (15)	54	—	71	G1 mucinous	IC	No	NED, 2 years
Hoile (9)	54	Vertical ellipse	44	Papillary serous	—	—	Discharged NED

TABLE 2
Low Malignant Potential Massive Ovarian Tumors

Source	Age	Incision	Size (lbs)	Pathology	Stage	Intact	Follow-up
Montgomery [18]	65	Midline	>100	Mucinous	IC	No	NED, 6 months
Kennedy [17]	31	Transverse	60	Mucinous	IC	No	Surgical death POD 64
Buller <i>et al.</i> [14]	30	Midline	177	Mucinous	IC	No	NED, 24 months
Kissinger [20]	35	Midline	51	Mucinous	IC	No	—

monitoring of the blood pressure. The supine position should be avoided in patients with very large abdominal masses, as the resultant vena cava compression can reduce the cardiac output with sudden loss of pulse [15]. The left lateral tilt position should be employed if the operation is performed in the supine position [10]. Some patients have been intubated sitting upright [15] and awake, by a nasal route [11,13]. Our patient was stable only in the left lateral recumbent position, necessitating an oral-endotracheal intubation in that position. A swan ganz should be inserted in all patients who have evidence of cardiac or respiratory compromise, are elderly, or are about to undergo operation in the supine position. Intraoperative and postoperative hypotension has been observed as a result of visceral venous pooling [1,7,9,13,14], hypertension as a result of increased cardiac return [1,2,7,9,12], and severe fluctuations to either extreme occurring as much as 48–72 hr after the operation [7,10,14].

Assessment of the ureters is necessary in patients who have a suggestion of retroperitoneal location by ultrasound. The ureter passed anterior to a 48-pound mass in one patient and was identified intraoperatively with avoidance of trauma [9]. Transvaginal ultrasonography with color doppler mode should be performed to determine the side of origin and evidence of malignancy by resistive index. This may not be possible in the patient who is not sexual or who is menopausal. It must be remembered that transabdominal or transvaginal studies will only visualize a small portion of the mass; thus, no firm exclusion of malignancy can be stated.

Nutritional evaluation with consideration of hyperalimentation should be undertaken preoperatively to maximize postoperative healing. Patients presenting with these large masses may be cachectic from either small bowel obstruction or tumor steal [7,11,13]. Mechanical and antibiotic bowel preparation have been recommended [17] and would be important when the patient has had extensive previous surgery, has evidence of partial or intermittent bowel obstruction, or when anticipating dissection of intra-abdominal adhesions to the bowel. Preoperative cantor tube placement or intraoperative nasogastric tube placement until bowel function returns has been suggested [1,9] because the postoperative ileus

can be prolonged and has been associated with fecal perforation secondary to distention in one case [1].

Loss of bladder tone as a result of chronic compression from the mass has been described [8] resolving with self-catheterization for 2 months.

While some surgeons advocate the use of a vertical incision [2] with overlapping closure of the fascia layers, we favor the low transverse incision described by Matory [8] as this is associated with less risk of ventral hernia formation and permits restoration of normal rectus abdominalis muscle function. Rectus tone above the incision usually returns within 2 to 4 months after surgery. Vertical elliptical incisions do not allow for adequate resection of the massive excess of skin in the vertical plane.

Our patient demonstrated marked distention and pulsation of the recanalized umbilical artery from the superior vesicle artery. Dense vascular adhesions had formed between the distal most regions of the mass wall and the abdominal wall. This is likely a result of infarction of the distal aspects of the tumor wall with parasitic revascularization from the anterior abdominal wall, forming dense fibrous adhesions around these vessels. Others have described similar vessels and adhesions [2,7,8,10,11,15,19] as the major cause of blood loss during their operation. For this reason it is important to have adequate supply of autologous, if possible, or banked packed red blood cells available.

The patient had been admitted to the psychiatric medical unit and received psychiatric evaluation even before she had been evaluated by the gynecologic oncology team. This is a reasonable approach given that it takes a significant aberration in psychological health to allow such a growth to proceed to such an incapacitating degree. Patients with large ovarian masses have been described as having difficulties with body image, self-esteem, sexuality, and social expectations [13] with some requiring intensive pre- and postoperative psychiatric management [12,14]. It has been shown that nonpsychotic patients may experience improvements in self-esteem, hygiene, and general self-care as a result of the removal of disfiguring masses [2]. However, we did not see this improvement in our patient, who continued to manipulate her family postoperatively in a fashion similar to her preoperative style.

Initial diagnosis of this tumor is usually quite obvious, particularly when the patient is standing and the mass can be seen protruding from the lower abdomen. However, the diagnosis has been missed in many patients [12,14,16] particularly those patients who are obese. In our patient the triceps skin fold suggested only minimal obesity. She weighed 210 lbs after the surgery and was measured at 5'10".

This report describes the intact safe removal of the world's largest ovarian mass. A multidisciplinary team approach was necessary to maximize care for this complex patient. Resection of the mass intact through a transverse elliptical incision with intense intraoperative and prolonged postoperative monitoring will provide the safest and optimal setting for these patients. Continued psychotherapy may be necessary in some patients.

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