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Systematic Review

Clinicopathological Characteristics and Surgical Management of Giant Ovarian Tumors in Postmenopausal Women: A Systematic Review

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Abstract

Background: Giant ovarian tumors (GOTs) have become increasingly rare in the era of widespread ultrasonography and cross-sectional imaging. However, they continue to pose significant diagnostic and surgical challenges, particularly in postmenopausal women, who have a higher baseline risk of borderline or malignant disease. This review aimed to evaluate the clinicopathological characteristics and surgical management of GOTs in postmenopausal women. **Methods:** A systematic search of PubMed and Scopus was conducted to identify case reports and small case series (≤10 patients) published between January 1, 2010, and November 30, 2025, describing GOTs (defined as ≥20 cm and/or ≥10 kg) in postmenopausal women who underwent open surgery. Data regarding tumor size, histology, surgical management, intraoperative spillage, complications, and International Federation of Gynecology and Obstetrics (FIGO) stage were extracted. Findings were primarily synthesized qualitatively, with additional descriptive and exploratory statistical analyses performed where appropriate. **Results:** 22 cases met the inclusion criteria. Benign tumors accounted for 68.2% (15/22), borderline lesions for 9.1% (2/22), and malignant tumors for 22.7% (5/22). The maximum reported tumor diameter, when derivable from the original reports, ranged from 20 to 58 cm. Surgical spillage was described in 36.4% of cases. No apparent association was observed between tumor size and malignancy. **Conclusions:** In GOTs, extreme size does not reliably predict malignancy. In the reviewed cases, preservation of capsular integrity during surgical removal appeared to be an important operative objective, particularly in mucinous lesions. However, the prognostic relevance of this observation cannot be established from the available heterogeneous case reports. As the present review included only cases managed by laparotomy, no definitive conclusions can be drawn regarding the feasibility or safety of minimally invasive surgery. The available evidence was limited to case reports and small case series, precluding formal quantitative synthesis. **Registration:** The study has been registered on https://www.crd.york.ac.uk/PROSPERO/ (registration number: CRD420261389870; registration link: https://www.crd.york.ac.uk/PROSPERO/view/CRD420261389870).

Keywords: giant ovarian tumor; postmenopausal women; mucinous borderline tumor; surgical management; capsular integrity; systematic review

1. Introduction

Giant ovarian tumors (GOTs) are commonly defined as adnexal masses exceeding 20–30 cm in maximum diameter or weighing at least 10 kg [1,2,3]. Their incidence has markedly declined in recent decades due to widespread access to pelvic ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI), which facilitate early detection and treatment of adnexal pathology before extreme enlargement occurs [1,2].

GOTs represent a complex clinical entity at the intersection of diagnostic, anesthesiologic, and surgical challenges [1,2,4,5]. Diagnostic stratification of malignancy risk is particularly uncertain in postmenopausal women, who exhibit a higher baseline prevalence of borderline and invasive ovarian neoplasms [1,3]. From a pathophysiological perspective, massive abdominal distension may impair venous return through inferior vena cava compression and induce restrictive ventilatory compromise due to diaphragmatic elevation. Abrupt intraoperative decompression may precipitate severe hemodynamic instability [4,6]. From a surgical perspective, organ displacement, increased tense capsular tension, and limited peritoneal working space increase the technical difficulty of dissection and the likelihood of capsular rupture [1,2,7]. Oncologically, this risk is particularly relevant in mucinous tumors, where intraoperative spillage may lead to pseudomyxoma peritonei or result in upstaging of borderline or invasive lesions [1,8].

Although rare, GOTs have continued to be reported in the literature over the past 15 years, most often involv-

ing mucinous epithelial tumors of exceptional dimensions. Their biological behavior remains heterogeneous: neither tumor size nor imaging characteristics reliably predict malignancy, while serum tumor markers frequently display nonspecific or only mild alterations [1,2,3]. The aim of this study was therefore to systematically review the literature on GOTs in postmenopausal women reported between 2010 and 2025, focusing on clinicopathological characteristics and surgical management.

2. Materials and Methods

2.1 Search Methods

A systematic literature search was conducted in accordance with the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [9], using Scopus and PubMed to identify case reports and small case series on GOTs published between January 1, 2010, and November 30, 2025 (Fig. 1). This time frame was selected to align with the descriptive aim of this review and established reporting guidelines for case reports and systematic reviews, to focus on studies reflecting contemporary diagnostic imaging, surgical techniques, and perioperative management, thereby improving comparability across cases [9,10].

For Scopus, the following query was used: TITLE-ABS-KEY("giant ovarian cyst" OR "giant ovarian tumor") AND TITLE-ABS-KEY("case report" OR "case series") AND TITLE-ABS-KEY(laparotomy OR surgery) AND (PUBYEAR > 2009).

For PubMed, the search strategy was: ("giant ovarian cyst"[Title/Abstract] OR "giant ovarian tumor"[Title/Abstract] OR "huge ovarian cyst"[Title/Abstract] OR "huge ovarian tumor"[Title/Abstract] OR "massive ovarian cyst"[Title/Abstract] OR "massive ovarian tumor"[Title/Abstract]).

2.2 Inclusion Criteria

Eligible studies were single case reports or small case series (≤10 patients) describing GOTs in postmenopausal women. This restriction was adopted to preserve clinical homogeneity and to allow detailed case-level qualitative analysis. Larger retrospective series were excluded because they typically include more heterogeneous patient populations and provided less granular information on individual tumor characteristics, surgical management, and outcomes relevant to the aims of this review. Tumors were classified as "giant" when they met at least one of the following criteria: maximum diameter ≥20 cm or weight ≥10 kg. Cases lacking precise measurements were included only when the authors explicitly described the tumor as giant or massive and when extreme size was clearly supported by clinical or imaging findings.

Reports were required to provide:

(1) patient age and menopausal status, whether explicitly stated or clearly deducible;

(2) final histopathological diagnosis;

(3) tumor size and/or weight; and

(4) treatment by open laparotomy.

Studies reporting exclusively laparoscopic or minimally invasive surgical management were excluded. No language restrictions were applied, provided that essential clinical information could be reliably extracted. For each included case, intraoperative or preoperative spillage was assessed exclusively on the basis of information explicitly reported in the original articles. Spillage was defined as any cyst wall rupture, intentional or unintentional drainage, aspiration, or leakage of cystic contents into the peritoneal cavity occurring preoperatively, intraoperatively, or following trauma.

The International Federation of Gynecology and Obstetrics (FIGO) stage was assigned only in malignant or borderline ovarian tumors, in accordance with the FIGO classification applicable at the time of publication and strictly based on the data provided in each report [11]. In benign lesions, FIGO staging was considered not applicable. In tumors apparently confined to the ovary, intraoperative rupture or spillage was considered consistent with FIGO stage IC only in borderline or malignant tumors, whereas extraovarian spread or malignant ascites corresponded to higher FIGO stages. No assumptions or retrospective reclassification beyond the information explicitly reported by the original authors were performed.

2.3 Study Selection and Data Extraction

Two reviewers (MP and MT) independently screened titles, abstracts, and full texts for eligibility. Discrepancies were resolved through discussion with the senior author. Data extraction was performed independently by the same two reviewers using a predefined data collection form. The following variables were collected when available: patient age and menopausal status, tumor size and/or weight, presenting symptoms, tumor markers, imaging findings, histological diagnosis, surgical management, intraoperative or preoperative spillage, perioperative complications, and FIGO stage where applicable. When necessary, study authors were contacted for clarification or to obtain missing information, including through ResearchGate, although not all queries received a response. No automation tools were used.

2.4 Statistical Analysis

Continuous variables were summarized as median, interquartile range (IQR), and range, whereas categorical variables were reported as counts and percentages. Exploratory comparisons were performed between benign and non-benign tumors (borderline and malignant combined), using the Mann-Whitney U test for continuous variables

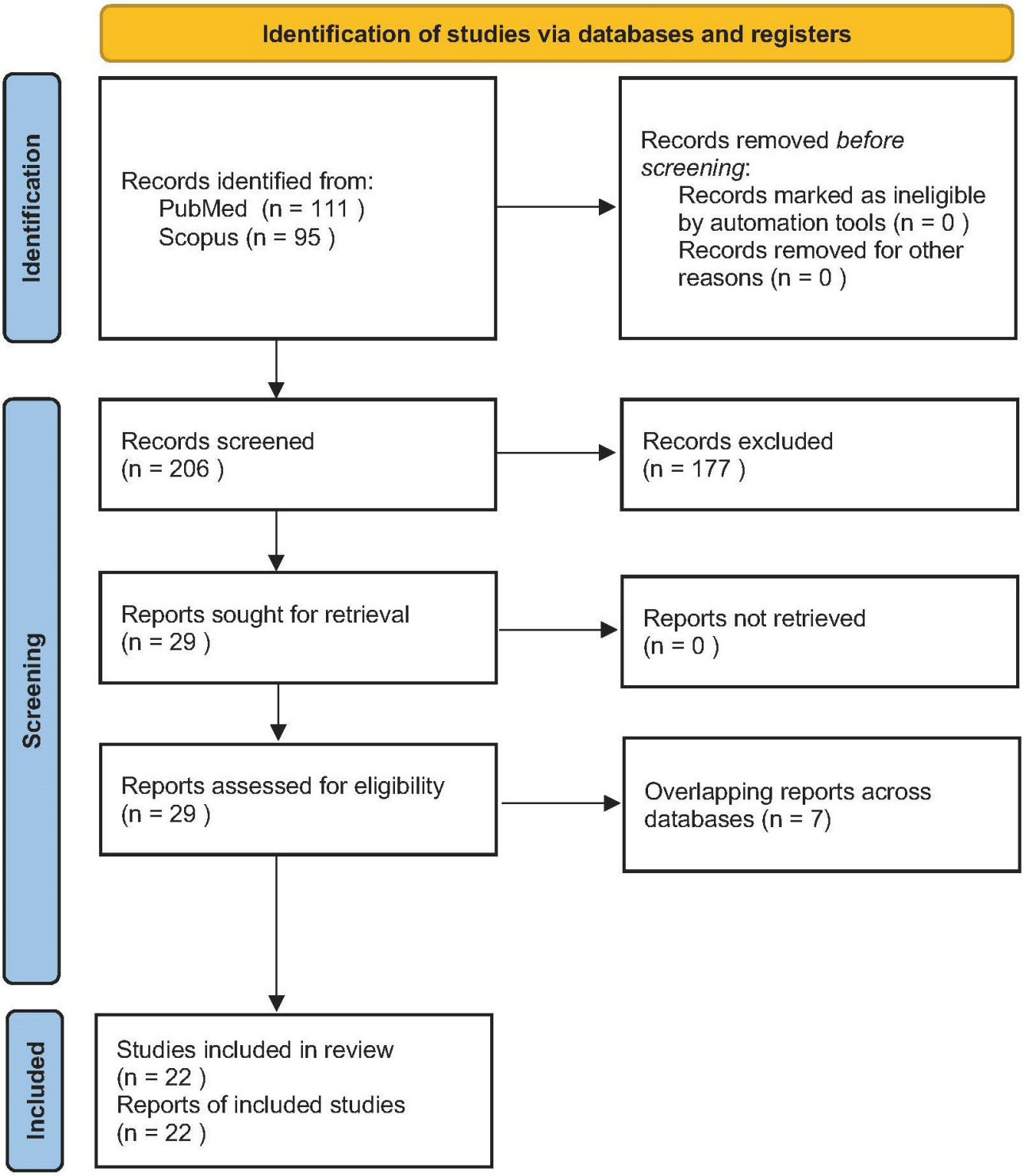

Fig. 1. PRISMA 2020 flow diagram illustrating the literature search and study selection process. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

and Fisher's exact test for categorical variables. Because tumor size reporting was heterogeneous across included reports, quantitative size analysis was restricted to the maximum reported tumor diameter in centimeters when derivable from the original report. A sensitivity analysis was performed after excluding cases with non-comparable capsular disruption mechanisms, including preoperative traumatic rupture, preoperative drainage, and intentional decompression. A $p < 0.05$ was considered statistically significant. Statistical analyses were performed using jamovi version 2.6.45 (https://macupdater.org/app_updates/appinfo/org.jamovi.jamovi/index.html).

Table 1. Summary of the 22 case reports of GOTs in postmenopausal women (2010–2025).

Case	Author/year	Age (years)	Size/weight/volume (cm/kg/mL)	Symptoms	Markers	Surgery	Complications	Spillage	Histology	FIGO stage (if applicable)
1	Fu et al., 2022 [2]	64	62 kg; 51,000 mL	Abdominal distension	NR	TAH-BSO	Hypotension; respiratory failure	Yes – intraoperative drainage	Mucinous borderline	IC
2	Moretti et al., 2023 [12]	66	29.5 × 20.8 × 25 cm	Pseudoascites, Abdominal distension	NR	Unilateral adnexectomy	NR	No	Mucinous cystadenoma	Not applicable
3	Yeika et al., 2017 [13]	65	20 cm	Pseudoascites, Abdominal distension	NR	Cystectomy	NR	No	Mucinous cystadenoma	Not applicable
4	Bamba et al., 2013 [4]	63	83,000 mL; 100 kg	Abdominal distension, dyspnea	NR	Staged drainage and resection	None	Yes – intraoperative drainage	Simple serous	Not applicable
5	Mounir et al., 2022 [7]	63	30 × 36 × 20 cm; 10 kg	Abdominal distension, strangulated hernia	NR	Emergency laparotomy with bowel resection and unilateral SO	None	No	Serous cystadenoma	Not applicable
6	Cai et al., 2020 [5]	66	23,000 mL	Abdominal distension, dyspnea, hydronephrosis	CA-125 ↑	TAH-BSO with staging	Ileus; bleeding (1000 mL)	Yes – intraoperative drainage	Mucinous cystadenoma	Not applicable
7	Tanaka et al., 2021 [14]	54	36 kg	Abdominal distension, dyspnea, pleural effusion	CA-125 mild ↑	Right SO	Meigs syndrome (resolved post-op)	No	Fibroma	Not applicable
8	Güler et al., 2021 [6]	69	30 × 20 × 15 cm; 3.75 kg	Shock after trauma	NR	Emergency laparotomy	Hemoperitoneum shock; transfusions	Yes – preoperative traumatic rupture	Low-grade serous carcinoma	FIGO III
9	Mikami et al., 2025 [15]	86	25 × 21 × 15 cm; 5.16 kg	Abdominal pain	CA-125 ↑	SO with vascular graft replacement	None	No	Mucinous cystadenoma	Not applicable
10	Lugata et al., 2024 [3]	67	36 × 30 × 18 cm; 23 kg	Compression symptoms, lower limb edema	CA-125 ↑	TAH-BSO	Mild hypotension	No	Mucinous borderline	FIGO IA
11	Daimon et al., 2019 [16]	69	27 cm + 4000 mL ascites	Abdominal distension, weight loss	CA-125 ↑	TAH-BSO with staging	None	Yes	Carcinosarcoma	FIGO IIIA1 (pT2bN1M0)
12	Miyanaga et al., 2021 [17]	82	33 cm; 10.6 kg	Abdominal distension, cancer palliation	NR	Tumor resection	None	No	Teratoma	Not applicable
13	Tjokroprawiro et al., 2025 [18]	67	30 cm	Abdominal pain, adnexal torsion	CA-125 ↑ (due to cervical cancer)	Bilateral SO	Torsion	No	Serous cystadenoma	Not applicable

Table 1. Continued.

Case	Author/year	Age (years)	Size/weight/volume (cm/kg/mL)	Symptoms	Markers	Surgery	Complications	Spillage	Histology	FIGO stage (if applicable)
14	Davydov et al., 2024 [19]	64	50 × 40 × 42 cm (~35 kg)	Abdominal distension, dyspnea	Normal markers	TAH-BSO with staging	NR	Yes – preoperative drainage	Mucinous carcinoma	FIGO IA
15	Benlghazi et al., 2023 [20]	63	18 × 20 × 22 cm	Acute adnexal torsion	CA-125 normal	Emergency TAH-BSO	None	No	Serous cystadenoma	Not applicable
16	Milulescu et al., 2021 [21]	61	39 × 28 cm; 10 kg	Abdominal distension, vaginal bleeding	CA-125 mild ↑	TAH-BSO with staging	None	No	Granulosa cell tumor	FIGO IA
17	Fernandez-Cuadros et al., 2019 [22]	57	29 × 25 × 22 cm	Dyspnea, ascites	CA-125 ↑; CA19-9 ↑↑	Debulking surgery	Severe postoperative hydrothorax	No	Mucinous cystadenocarci-noma	FIGO II
18	Gwanzura et al., 2019 [23]	48	Occupying entire abdominopelvic cavity	Abdominal distension, urinary compression	CA-125↑; CEA↑	Laparotomy with drainage	Shock, arrest, pneumothorax, DIC, MOF, death	Yes – intraoperative drainage	Mucinous cystadenoma	Not applicable
19	Goudarzian et al., 2018 [24]	70	10 kg	Abdominal distension, repeated paracentesis	CEA ↑	Cyst excision	None	No	Simple serous	Not applicable
20	Tola et al., 2016 [25]	53	27 kg; 50 cm	Abdominal distension, deep vein thrombosis	Normal	TAH-BSO	DVT pre-op	No	Mucinous cystadenoma	Not applicable
21	Bhasin et al., 2014 [26]	85	27 kg; 25,700 mL; 58 × 46 cm	Abdominal distension	NR	TAH-BSO	NR	Yes – intentional decompression	Mucinous cystadenoma	Not applicable
22	Savulescu et al., 2014 [27]	68	40 × 30 × 20 cm; 26 kg	Abdominal distension, pain	Normal	Laparotomy with bilateral SO	Reoperation for bleeding	No	Mucinous cystadenoma	Not applicable

Information included: Author/year, age, size/weight/volume, symptoms, tumor markers, surgical procedure, complications, spillage, histology, and FIGO Stage.

Abbreviations: TAH-BSO, total abdominal hysterectomy with bilateral salpingo-oophorectomy; SO, salpingo-oophorectomy; BSO, bilateral salpingo-oophorectomy; FIGO, International Federation of Gynecology and Obstetrics; NR, not reported; CA19-9, carbohydrate antigen 19-9; CEA, carcinoembryonic antigen; DIC, disseminated intravascular coagulation; MOF, multiorgan failure; DVT, deep vein thrombosis; GOTs, giant ovarian tumors; Pre-op, preoperative; ↑, elevated; ↑↑, markedly elevated.

2.5 Synthesis of Results

Given the rarity of the condition and the heterogeneity of the available reports, findings were synthesized primarily through qualitative analysis, with additional descriptive and exploratory statistical analyses performed where appropriate.

2.6 Risk of Bias and Registration

A formal risk of bias assessment was not performed, given the descriptive nature of the review and the predominance of case reports and small case series included in this study. This review was registered in PROSPERO (International Prospective Register of Systematic Reviews) under registration number CRD420261389870. No review protocol was prepared.

3. Results

3.1 Study Selection

The PubMed search yielded 111 records, of which 12 case reports met the predefined inclusion criteria following full-text evaluation. The Scopus search initially identified 95 records, of which 17 reports were considered potentially eligible and advanced for full-text assessment. Of these, 7 represented overlapping reports across databases, yielding 10 unique additional case reports from Scopus. In total, 22 case reports of GOTs in postmenopausal women managed by open laparotomy were incorporated into the qualitative synthesis (Fig. 1) [2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27].

3.2 Study Results

Patients ranged in age from 48 to 86 years, with a median age of 65.5 years. All cases were managed through midline laparotomy, reflecting the consistent preference for open surgery when cystic masses reach extreme dimensions and compromise intra-abdominal working space. En bloc removal was reported in the majority of patients, although controlled intraoperative or preoperative drainage was described in selected cases to facilitate surgical exposure in particularly tense or space-occupying cysts. Across the reviewed reports, laparotomy was generally selected to minimize the risk of capsular rupture, particularly in large mucinous tumors, and to allow complete surgical staging when borderline or malignant pathology was suspected [2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27]. The main characteristics of the 22 included cases are summarized in Table 1 (Ref. [2,3,4,5,6,7,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27]).

The baseline characteristics of the included cases are summarized in Table 2. Median age was 65.5 years (IQR: 63.0–69.0; range: 48–86). Histology was benign in 15/22 cases (68.2%), borderline in 2/22 (9.1%), and malignant in 5/22 (22.7%). Spillage was reported in 8/22 cases (36.4%), whereas 14/22 (63.6%) had no reported spillage. Complications were reported in 10/22 cases (45.5%), absent in 8/22 (36.4%), and not reported in 4/22 (18.2%). Because tumor size reporting was heterogeneous across included reports, quantitative analysis was restricted to the maximum reported tumor diameter in centimeters, which was available in 16/22 cases, with a median of 31.5 cm (IQR: 28.5–39.3; range: 20–58).

Exploratory comparisons between benign and non-benign tumors are presented in Table 3. No statistically significant differences were observed between the two groups regarding age, maximum reported tumor diameter, spillage, or complications.

Sensitivity analysis excluding cases with non-comparable capsular disruption mechanisms is presented in Table 4. After excluding cases involving preoperative traumatic rupture, preoperative drainage, and intentional intraoperative decompression, the overall proportion of spillage decreased; however, no significant difference was observed between benign and non-benign tumors.

3.3 Histopathology

Benign and borderline epithelial tumors represented the most frequent histological subtype, accounting for 10/22 cases (45.5%), including 8 benign mucinous cystadenomas and 2 mucinous borderline tumors. Serous epithelial tumors comprised the second largest group (6/22; 27.3%), including 3 benign serous cystadenomas, 2 simple serous cysts, and 1 low-grade serous carcinoma. 2 additional non-epithelial benign tumors were identified, specifically an ovarian fibroma associated with Meigs syndrome and a mature teratoma, contributing to a total of 15/22 benign lesions (68.2%). Malignant tumors accounted for 5/22 cases (22.7%), including 4 epithelial carcinomas (mucinous adenocarcinoma, mucinous cystadenocarcinoma, low-grade serous carcinoma, and ovarian carcinosarcoma) and 1 granulosa cell tumor. Finally, borderline lesions were limited to 2/22 cases (9.1%), both of the mucinous subtype.

3.4 Tumor Dimensions

Extreme tumor dimensions were observed. Because size reporting was heterogeneous across reports, quantitative analysis was restricted to the maximum reported tumor diameter in centimeters when derivable from the original report. Among the 16 evaluable cases, maximum tumor diameter ranged from 20 to 58 cm, with a median of 31.5 cm (IQR: 28.5–39.3). No apparent association was observed between extreme tumor dimensions and malignancy in the reviewed cases [2,3,19,23,25].

3.5 Clinical Presentation

Clinical presentation was universally dominated by mass-effect symptoms. Abdominal distension was the most frequently reported presenting symptom across the included

Table 2. Baseline characteristics of the 22 included cases.

Variable	Value
Number of cases	22
Age, years	65.5 (IQR: 63.0–69.0 range: 48–86)
Maximum reported tumor diameter, cm*	31.5 (IQR: 28.5–39.3; range: 20–58)
Benign histology	15/22 (68.2%)
Borderline histology	2/22 (9.1%)
Malignant histology	5/22 (22.7%)
Spillage present	8/22 (36.4%)
No spillage	14/22 (63.6%)
Complications present	10/22 (45.5%)
No complications	8/22 (36.4%)
Complication data not reported	4/22 (18.2%)

*Calculated only in cases where a maximum tumor diameter in centimeters could be derived from the original report. IQR, interquartile range.

Table 3. Exploratory comparison of clinical and tumor characteristics between benign and non-benign tumors.

Variable	Benign (n = 15)	Non-benign (n = 7)	*p*-value
Age, years	66 (63.0–70.0)	64.0 (61.0–69.0)	0.860
Maximum reported tumor diameter, cm†	31.5 (25–40)	33.0 (29.0–39.0)	0.828
Spillage present	4/15 (26.7%)	4/7 (57.1%)	0.343
Complications present‡	6/12 (50.0%)	4/6 (66.7%)	0.638

Values for continuous variables are reported as median (IQR). *p*-values from Mann-Whitney U test for continuous variables and Fisher's exact test for categorical variables. †Among cases with measurable maximum diameter in centimeters. ‡‡ Restricted to cases with reported complication status; values are presented as number of cases with complications/number of cases with available complication data.

Table 4. Sensitivity analysis of spillage rates after exclusion of cases with non-comparable capsular disruption mechanisms.

Variable	Main analysis	Sensitivity analysis
Number of evaluable cases	22	19
Spillage present	8/22 (36.4%)	5/19 (26.3%)
Spillage in benign tumors	4/15 (26.7%)	3/14 (21.4%)
Spillage in non-benign tumors	4/7 (57.1%)	2/5 (40.0%)
p-value for benign vs non-benign spillage	0.343	0.570

cases [2,7,12,13]. Respiratory compromise was frequently attributable to tumor-mediated diaphragmatic elevation, manifesting as dyspnea or orthopnea in 5/22 cases (22.7%), particularly in the supine position [4,5,13]. Gastrointestinal manifestations were variable and included early satiety, constipation, pseudoascites (2/22; 9.1%), and, less commonly, true ascites (1/22; 4.5%). Urinary symptoms attributable to ureteral compression or hydronephrosis were reported in 2/22 patients (9.1%). Venous and lymphatic compression resulted in lower-limb edema or deep vein thrombosis in 2/22 cases (9.1%), confirming the hemodynamic relevance of large adnexal masses [4,6,18,25].

Less frequent but clinically severe presentations included acute adnexal torsion (2/22; 9.1%), strangulated hernia (1 case; 4.5%), and post-traumatic rupture with hypovolemic shock (1 case; 4.5%) [6,18]. Rare systemic manifestations were also observed, including pleural effusion secondary to Meigs syndrome (1/22; 4.5%), progressive cachexia (1/22; 4.5%), and postmenopausal vaginal bleeding (1/22; 4.5%) [14,17,21].

Overall, symptom severity did not correlate with histological diagnosis, and even benign or borderline tumors produced significant respiratory, vascular, and gastrointestinal dysfunction due to their extreme dimensions [1,2,3,23].

3.6 Tumor Markers and Imaging

Serum tumor markers demonstrated poor discriminatory value [1,2,3]. CA-125 results were available in 14/22 cases and were normal or only mildly elevated in 9/14 (64.3%), including cases of benign and borderline histology; one apparent CA-125 elevation was unrelated to ovarian pathology, occurring in a patient with concomitant cervical cancer. Carcinoembryonic antigen (CEA) elevation

was documented in 3/6 evaluable cases (50.0%), and carbohydrate antigen 19-9 (CA19-9) in 2/3 (66.7%). However, increases were observed in both benign and malignant mucinous tumors, showing no reliable histologic correlation.

Ultrasound typically demonstrated a giant multiloculated cystic mass; however, loss of the sonographic window in lesions exceeding 25–30 cm frequently led to misinterpretation as pseudoascites or free peritoneal fluid [7,13]. CT represented the most informative imaging modality, particularly for assessing organ displacement, hydronephrosis, and the absence of peritoneal implants [2,5,7]. MRI was selectively useful in differentiating T2-hypointense pseudonodules from true solid components [2,3]. Despite multimodal imaging, preoperative histological prediction remained unreliable when the tumor filled the abdominal cavity, due to limited visualization of mural nodules and inconsistent biomarker profiles [1,2,3,19].

3.7 Surgery and Perioperative Management

All patients underwent open surgery via midline laparotomy. Total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO) was the most frequently performed procedure, conducted in 9/22 cases (40.9%), predominantly in postmenopausal patients requiring definitive oncologic treatment. Isolated salpingo-oophorectomy (SO) or unilateral adnexectomy was performed in 5/22 cases (22.7%), typically when intraoperative appearance suggested a benign lesion or when operative time needed to be minimized in frail patients [2,7,24].

Emergency surgery was required in 5/22 cases (22.7%), due to acute complications such as bowel obstruction, adnexal torsion, traumatic rupture with hemodynamic shock, or rapid clinical deterioration [6,18]. Cystectomy alone was conducted in only 3/22 patients (13.6%), reflecting the elevated risk of capsular rupture, incomplete removal, and understaging in GOTs [1,3,23,25].

Across the included reports, all patients were managed by open surgery. However, as this review was restricted to cases treated by laparotomy, no definitive conclusions can be drawn regarding the feasibility or safety of minimally invasive surgery for GOTs, and surgical decision-making should remain individualized.

3.8 Surgical Spillage and FIGO Stage

Surgical spillage was reported in 8/22 cases (36.4%), occurring either as controlled intraoperative or preoperative drainage or as spontaneous rupture prior to surgery. In the remaining cases, the ovarian mass was removed intact without capsular rupture. In an exploratory comparison, spillage was observed in 4/15 benign tumors (26.7%) and 4/7 non-benign tumors (57.1%), with no statistically significant difference between groups (Table 3). After exclusion of cases with non-comparable capsular disruption mechanisms, the overall frequency of spillage decreased to 5/19 cases (26.3%), and no statistically significant difference was observed between benign and non-benign tumors (Table 4). Spillage was recorded as a descriptive surgical variable in all cases regardless of histological diagnosis; however, its relevance to FIGO staging was considered only in borderline or malignant tumors, as FIGO staging was not applicable to benign lesions even when capsular rupture or drainage occurred.

Among malignant and borderline tumors (7/22 cases, 31.8%), FIGO stage was available in all reports. Five tumors were classified as FIGO stage I (IA–IC), including 2 borderline mucinous tumors (1 stage IA and 1 stage IC) and 3 malignant tumors (1 stage IA and 1 stage IC1, in addition to the borderline stage IC case). The remaining malignant tumors presented with more advanced disease, including 1 FIGO stage II case and 2 FIGO stage III cases (one stage III and one stage IIIA1). Thus, spillage was considered consistent with FIGO stage IC only in borderline or malignant tumors apparently confined to the ovary, and not in benign tumors.

3.9 Complications

Perioperative morbidity was reported in 10/22 cases (45.5%), while no complications occurred in 8/22 patients (36.4%). In the remaining 4/22 cases (18.2%), complication data were not reported in the original articles. The most frequent adverse events were bleeding-related complications (4/22; 18.2%), including intraoperative hemorrhage requiring transfusion and 1 case requiring reoperation for postoperative bleeding. Hemodynamic instability and/or shock occurred in 3/22 cases (13.6%), 2 of which were associated with tumor rupture or hemoperitoneum [4,5,6]. Respiratory complications were documented in 3/22 cases (13.6%), including postoperative hydrothorax, pneumothorax, and 1 case of respiratory failure [4,15,22]. Venous involvement was uncommon but clinically significant, with Meigs syndrome and deep vein thrombosis each reported in 1 case (2/22; 9.1%) [14,25]. The most severe outcome was observed in a patient who developed multiorgan failure following hemodynamic shock and pneumothorax, representing the only perioperative death in the series (1/22; 4.5%) [23].

3.10 Oncologic Outcome

Oncologic outcome reporting was limited and heterogeneous across the included case reports. Favorable outcomes were reported in cases in which the tumor appeared confined to the ovary and was removed without rupture [1,2,3,19]. Specifically, FIGO I borderline tumors remained disease-free at follow-up in the available reports, and mucinous carcinomas apparently confined to the ovary also showed favorable outcomes in the absence of rupture or spillage [19].

Conversely, adverse outcomes were described in cases involving rupture, decompression, or spillage, including postoperative hemodynamic instability and, in 1 case, mul-

tiorgan failure leading to death in a patient with benign mucinous cystadenoma [4,6,23]. Among frankly malignant tumors, carcinosarcoma and advanced low-grade serous carcinoma appeared to represent the most aggressive histological subtypes in the reviewed series, although complete surgical resection was generally achievable [16,19].

Across the reviewed cases, capsular integrity appeared to be a clinically relevant descriptive factor, whereas no apparent association was observed between extreme tumor dimensions and malignancy or adverse outcome [1,2,3,19,23]. However, given the small number of heterogeneous reports and the absence of standardized comparative outcome data, these findings should be interpreted as descriptive observations rather than firm prognostic conclusions.

4. Discussion

GOTs in postmenopausal women represent a rare yet clinically relevant condition in which remarkable tumor size does not reliably predict biological aggressiveness [1,2,3]. Even when associated with massive abdominal distension, rapid enlargement, and a postmenopausal context, features traditionally considered suggestive of malignancy, the final histological diagnosis may reveal benign or borderline lesions [2,3].

A first descriptive observation emerging from this review is that no apparent association was observed between tumor dimensions and malignancy. Although all lesions exceeded standard thresholds for classification as giant tumors, approximately three-quarters (17/22, 77.3%) were benign or borderline, whereas only about one-quarter (5/22, 22.7%) represented invasive neoplasms. Mucinous cystic tumors predominated across all size categories, consistent with their known capability for prolonged intracystic expansion with limited stromal invasion [1,2,23]. These findings suggest that extraordinary tumor size alone should not be considered inherently indicative of malignancy, as previously reported in the literature [2,3,5,7].

A second observation is that diagnostic tools that are reliable in conventional adnexal masses demonstrate limited specificity in GOTs. CA-125 was frequently normal or only mildly elevated even in borderline and malignant tumors, reducing its predictive value [1,3]. CEA and CA19-9, although typically associated with mucinous histology, showed inconsistent elevation across benign, borderline, and malignant lesions, limiting their discriminatory utility [3,19,23]. These findings may hypothetically reflect dilution or compartmentalization of tumor markers within large intracystic volumes, as well as chronic peritoneal stretching leading to attenuated inflammatory responses [2,5].

Similarly, imaging accuracy decreases once the maximum tumor diameter exceeds 25–30 cm. Anatomical landmarks become distorted, ascites may be mimicked by intracystic fluid, and mural nodules can be obscured by intracystic pressure [7,13]. CT reliably assesses mass effect, hydronephrosis, and the absence of peritoneal implants but cannot distinguish borderline from invasive disease [2,5,7]. MRI may better characterize pseudonodules or epithelial proliferations; however, histological examination remains the only definitive diagnostic method [2,3].

From a surgical perspective, all cases included in this review were managed by open surgery. This likely reflects the technical and anesthesiologic challenges associated with very large adnexal masses, including limited working space, organ displacement, and concern for capsular rupture. In the reviewed cases, intact *en bloc* removal was generally preferred whenever feasible, particularly in mucinous lesions, in which spillage may carry adverse oncologic implications [1,3,23,25]. However, as the present review included only patients treated by laparotomy, no definitive conclusion can be drawn regarding the feasibility or safety of minimally invasive surgery in GOTs, and surgical decision-making should remain individualized. These observations are consistent with the broader literature on borderline ovarian tumors, which highlights their biological heterogeneity and the persistent difficulty in identifying reliable prognostic markers based on isolated clinical or pathological parameters. In this context, cautious interpretation is warranted, and surgical planning should be tailored to the patient, particularly in the management of large adnexal masses in which preoperative and intraoperative diagnostic uncertainty may be substantial [28].

The anesthesiologic and thromboembolic implications of GOTs are substantial. Diaphragmatic elevation and inferior vena cava compression may compromise respiratory function and venous return, predisposing patients to thromboembolic and hemodynamic complications [4,6,25]. Likewise, abrupt decompression, whether spontaneous or iatrogenic, may precipitate severe hemodynamic instability [4,5,6]. When decompression is considered unavoidable, drainage should be performed in a controlled and gradual manner under close anesthesiologic and hemodynamic monitoring. However, specific drainage protocols or rates could not be derived from the reviewed literature, as reporting was inconsistent across the included case reports. These observations support the importance of careful preoperative planning, multidisciplinary assessment, and cautious intraoperative management in selected cases.

Finally, the prognostic interpretation of the findings from this review should remain cautious. In the reviewed reports, favorable outcomes were more frequently described when tumors were apparently confined to the ovary and removed without rupture [1,2,3,19,23]. Accordingly, capsular integrity may represent a clinically relevant descriptive factor in these cases. Nevertheless, given the small number of heterogeneous case reports and the absence of comparative outcome data, these findings should be regarded as descriptive observations rather than definitive prognostic conclusions.

Limitations

This review has several limitations. The available evidence is limited to case reports and small case series, and some included studies provided incomplete or non-uniform data regarding imaging findings, tumor markers, surgical details, follow-up, and oncologic outcomes. Furthermore, publication bias and marked heterogeneity across reports limit the strength of the available evidence. Although the Joanna Briggs Institute (JBI) critical appraisal checklists are applicable to case reports and case series, a formal methodological quality assessment was not performed. The primary aim of this review was to provide a descriptive synthesis of the clinical, pathological, and surgical characteristics of giant ovarian tumors in postmenopausal women rather than to evaluate comparative effectiveness or therapeutic interventions. Moreover, considering the rarity of this condition and the predominance of isolated case reports, a formal appraisal would mainly reflect the completeness of reporting of individual cases and would not overcome the inherent risks of publication bias, selective reporting, and clinical heterogeneity. Accordingly, the findings should be interpreted as exploratory and hypothesis-generating. The literature search was limited to PubMed and Scopus and did not include grey literature sources or other databases such as Web of Science; therefore, some potentially relevant reports may have been missed. Quantitative synthesis was not feasible because of the marked clinical and methodological heterogeneity. Nevertheless, the application of predefined eligibility criteria allowed for a focused and consistent descriptive analysis of GOTs in postmenopausal women.

5. Conclusions

GOTs in postmenopausal women are a rare but clinically relevant condition in which tumor size alone does not reliably predict malignancy. The available evidence suggests that careful preoperative assessment and a cautious surgical strategy aimed at intact tumor removal are important, particularly in mucinous lesions. However, because the present review is based on a limited and heterogeneous body of case reports and small case series, no firm prognostic conclusions can be drawn, and the findings should be interpreted with caution.

Availability of Data and Materials

The data supporting the findings of this study are available within the article and its supplementary material.

Author Contributions

MP, SG, and AF: Conceptualization. MP and AF: Project development. MP, MT, and LA: Literature search. MP, MT, and GM: Data analysis. MP, MT, LA, GM, PM, and DR: Interpretation of data. MP and MT: Manuscript writing. LA and GM: Manuscript editing. PM, DR, SG, and AF: Critical revision of the manuscript. DR, SG, and AF: Supervision. AF: Validation. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Not applicable.

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Conflicts of Interest

The authors declare no conflict of interest. Sandro Gerli and Alessandro Favilli are serving as one of the Editorial Board members of this journal. We declare that Sandro Gerli and Alessandro Favilli had no involvement in the peer review of this article and have no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to Michael H. Dahan.

Declaration of AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the authors used ChatGPT (OpenAI), specifically GPT-5.4 to assist with language editing, spelling, and grammar revision. After using this tool, the authors carefully reviewed and edited the content as needed and take full responsibility for the content of the publication.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.31083/CEOG51055.

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