EJGO European Journal of Gynaecological Oncology

Original Research

A retrospective analysis of giant ovarian tumors weighing more than 5,000 grams

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Summary

Objectives: The aim of this study was to evaluate the relation between pathology, operative complications, and giant ovarian tumor weighing more than 5,000 grams. *Materials and Methods:* The authors assessed 11 factors of 18 patients with giant ovarian tumors after surgery, including age, performance status (PS), total weight of the tumor, fluid weight of the tumor, pathology, side, preoperative serum D-dimer, rate of deep venous thrombosis (DVT), intraoperative complications, and rate of postoperative ICU management. The subjects were divided into two groups: tumor weight ≥ 10,000 grams (group ≥ 10,000 grmas) and tumor weight < 10,000 grams (group < 10,000 grams), and the same factors were compared between two groups. *Results:* The most frequent pathology of giant ovarian tumors weighing more than 5,000 grmas was found to be adenocarcinoma. Compared to 11 patients of group < 10,000 grmas, seven patients out of group ≥ 10,000 grmas had a significantly higher rate of intra-abdominal adhesion (85.7% *vs.* 9.0%, $p < 0.05$), blood loss weight (890 grams *vs.* 130 grams, $p < 0.05$), and rate of postoperative ICU management (85.7% *vs.* 18.2%, $p < 0.05$), respectively. *Conclusions:* Much attention should be paid to patients with giant ovarian tumors, and aggressive surgery is recommended due to a frequent incidence of cancer.

Key words: Giant ovarian tumor; Mucinous adenocarcinoma; Mucinous border line tumor.

Introduction

The definition of giant ovarian tumors has not been established. The size of giant ovarian tumors can be diagnosed by transverse and vertical diameter by CT or MRI before surgery. One author defined giant ovarian tumors as those measuring more than 10 cm with preoperative scans [1], whereas another author defined giant ovarian tumors as those reaching above the umbilicus [2]. In contrast, there are few reports evaluating giant ovarian tumors by their weight after surgery. However, it is unknown whether the most frequent pathology of giant ovarian tumors is benign or not. Because almost all literature on giant ovarian tumors was published as a case report, there is no information concerning the comprehensive data about the pathology and operative complications of giant ovarian tumors.

In this study, the authors assessed 18 patients with giant ovarian tumors weighing more than 5,000 grams to clarify the pathology and surgical complications of giant ovarian tumors.

Materials and Methods

The authors assessed 18 patients with giant ovarian tumors who had undergone surgery and obtained pathological diagnosis in Kobe University Hospital between January 2011 and March 2014. The authors obtained the approval of submission by written consent from all patients. In this study, they defined ovarian tumors weighing more than 5,000 grams as giant ovarian tumors. Age, performance status (PS), total weight of the tumor, fluid weight of the tumor, pathology, side, preoperative serum D-dimer, rate of deep venous thrombosis (DVT), intraoperative complications (rate of intra-abdominal adhesion and blood loss weight), and rate of postoperative ICU management were evaluated.

The authors divided the patients into two groups: tumor weight ≥ 10,000 grams (group ≥ 10,000 grams) and tumor weight < 10,000 grams (group < 10,000 grams) because they considered that the tumors weighing more than 10,000 grams would be accompanied by several risks during the study. The group ≥ 10,000 grams included seven patients and the group < 10,000 grams consisted of 11 patients. Age, PS, serum D-dimer, rate of DVT, rate of intra-abdominal adhesion, fluid weight of the tumor, blood loss weight, and rate of postoperative ICU management were compared between two groups. The grade of PS was assessed based on Eastern Cooperative Oncology Group PS. PS 4 means "completely disabled, cannot carry on any selfcare, totally confined to bed or chair". We defined tumor with more than 1/2 surface being adherent to the peritoneum as positive for intra-abdominal adhesion.

Mann–Whitney *U*-test and Fisher's exact test were used to analyze the differences between two groups. Statistical significance was defined as p less than 0.05.

Results

Table 1 shows the clinical characteristics and complications of all 18 patients, and data are also summarized in Table 2. The median total weight of the tumor was 8,750 (range; 5,000 to 33,100) grams, and the median fluid weight of the tumor was 5,250 (range: 450 to 32,600)

Revised manuscript accepted for publication October 26, 2017

Eur. J. Gynaecol. Oncol. - ISSN: 0392-2936
XL, n. 4, 2019
doi: 10.12892/ejgo4414.2019

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www.irog.net

Published: 10 August 2019

Table 1. — *Clinical backgrounds and complications.*

	Age	Total weight (g)	Fluid weight (g)	Side	Operation	Pathology	D-dimer (μg/ml)	PS	DVT	Adhesion	Blood loss weight (g)	ICU management
1	45	5,000	450	R	RSO	Mucinous adenocarcinoma	1.7	2	-	-	350	-
2	20	5,050	4,400	L	LSO	Mucinous border line	0.5	1	-	-	30	-
3	64	5,500	4,200	R	RSO	Mucinous border line	2.5	1	-	-	160	-
4	59	6,100	4,600	L	LSO	Mucinous border line	1.1	1	-	-	490	-
5	86	6,900	5,000	L	LSO	Mucinous border line	2.4	2	-	-	115	-
6	21	6,980	5,500	L	LSO	Mucinous adenocarcinoma	3.9	2	-	-	130	-
7	70	7,300	6,800	L	LSO	Serous adenocarcinoma	1.7	1	-	-	50	-
8	16	7,500	2,000	L	LSO	Mucinous border line	2.3	1	-	-	120	-
9	43	8,500	7,000	L	LSO	Mature cystic teratoma	4	2	-	-	50	-
10	61	9,000	650	L	LSO	Mucinous adenocarcinoma	2.8	1	-	-	980	+
11	67	9,500	1,200	L	ATH+BSO	Mucinous adenocarcinoma	1.5	2	+	+	450	+
12	62	10,700	5,700	L	ATH+BSO	Clear cell adenocarcinoma	2.4	3	-	+	1,730	+
13	78	11,500	6,500	L	LSO	Fibroma	5.6	3	+	-	130	-
14	40	18,500	5,000	R	RSO	Mucinous border line	7	3	-	+	890	+
15	55	20,000	15,000	L	ATH+BSO	Endometriotic tumor	1.7	4	-	+	3,210	+
16	67	21,950	18,450	R	BSO	Mucinous adenocarcinoma	3.6	4	-	+	155	+
17	26	25,170	24,100	L	LSO	Mucinous adenoma	1.6	3	-	+	560	+
18	33	33,100	32,600	L	ATH+BSO	Mucinous adenocarcinoma	10.9	4	+	+	1,415	+

R: right, L: left, RSO: right salpingo-oophorectomy, LSO: left salping oophorectomy, ATH: abdominal total hysterectomy, BSO: bilateral salpingo-oophorectomy, PS: performance status, DVT: deep venous thrombosis, ICU: intensive care unit.

Table 2. — *Summary of Table 1 (n=18).*

	Median (range)		n (%)
Age (years)	57 (16-86)	DVT	3 (16.7)
PS	2 (1-4)	Adhesion	7 (38.9)
D-dimmer (μg/ml)	2.4 (0.5-10.9)	Left side tumor	14 (77.8)
Fluid weight (g)	5,250 (450-32,600)	ICU management	8 (44.4)
Total weight (g)	8,750 (5,000-33,100)		
Blood loss weight (g)	255 (30-3,210)		

Table 3. — *Comparison of parameters between two groups.*

	Tumors > 10,000 g n=7	Tumors < 10,000 g n=11	*p*
Age (years)	55 (26-78) *	59 (16-86) *	NS#
PS 3	(3-4) *	1 (1-2) *	< 0.05#
D-dimmer (μg/ml)	3.6 (1.6-10.9) *	2.3 (0.5-4.0) *	NS#
DVT (%)	28.6	9	NS##
Adhesion (%)	85.7	9	< 0.05##
Fluid weight (g)	15,000 (5,000-32,600) *	4,400 (0-7,000) *	< 0.05#
Blood loss weight (g)	890 (130-3210) *	130 (30-980) *	< 0.05#
ICU management (%)	85.7	18.2	< 0.05##

* *Median (range), # Mann-Whitney U test, ## Fisher's exact test.*

grams. Pathological examinations revealed six cases of mucinous adenocarcinoma, one case of clear cell carcinoma, one case of serous cyst adenocarcinoma, six cases of mucinous borderline malignancy, and four cases of benign tumors. Preoperative median serum D-dimer was elevated at 2.4 μg/ml ranging from 0.5 to 10.9 (normal range: < 1.0) μg/ml, but DVT was observed only in three cases (16.7 %). Out of 18 cases with giant ovarian tumors, 14 cases (77.8%) were found to originate from the left ovary (Table 2).

Compared with 11 patients of group <10,000 grams, seven patients of group ≥ 10,000 grams had significantly higher PS (median: 3 *vs.* 1, $p < 0.05$), rate of intra-abdominal adhesion (85.7% *vs.* 9.0%, $p < 0.05$), fluid weight (15,000 grams *vs.* 4,400 grams, $p < 0.05$), blood loss weight (890 grams *vs.* 130 grams, $p < 0.05$), and rate of postoper-

ative ICU management (85.7% *vs.* 18.2%, $p < 0.05$), respectively (Table 3). All 18 patients were discharged home without major complications.

Discussion

To the present authors' knowledge, this report appears to be the first description about the pathology and operative complications of 18 patients with giant ovarian tumors which were evaluated by tumor weight. In this study, the authors confirmed two important clinical observations. First, the most frequent pathology of giant ovarian tumors weighing more than 5,000 grams was shown to be adenocarcinoma. Second, patients of group ≥ 10,000 grams had more intra- and post-operative complications than those of group < 10,000 grams.

First, the most frequent pathology of giant ovarian tumors weighing more than 5,000 grams was adenocarcinoma. Unlike many articles reporting giant ovarian benign tumors, the present authors found three cases of giant ovarian cancer [3-5] and two cases of giant ovarian borderline tumor [6, 7]. Kobayashi *et al.* reported that postmenopausal women with ovarian endometriomas measuring 9 cm or greater in diameter had a highest prevalence rate of ovarian cancer [8]. In contrast, Ottesen *et al.* reported that 76.2% of ovarian tumors weighing more than 20 kg were benign cysts and that the majority of malignant cases were borderline tumors [9]. However, they did not analyze the data regarding the pathology, patients' backgrounds, and treatments [9]. Despite diverse reports regarding the pathology of giant ovarian tumors, the results of this study and previous reports suggest that at least, benign tumors do not predominate in giant ovarian tumors. Furthermore, pathological type of most giant ovarian tumors was shown to be mucinous tumor [3-7, 10, 11]. This fact is in agreement with the results of the present study.

Second, patients of group ≥ 10,000 grams had more intra- and post-operative complications than those of group < 10,000 grams. In patients of group ≥ 10,000 grams, body movement was limited remarkably, and they could not walk by their own strength, and patients' PS was worsened by the burden of tumor weight. The reason for the necessity for postoperative careful ICU management in patients of group ≥ 10,000 grams may be due to the persistent worsening of circulatory and respiratory conditions caused by the bleeding at the adhesiolysis of tumor from the surrounding tissues, compared with group < 10,000 grams. This result was in accord with those of previous reports [3, 5, 6, 12]. Therefore, we should be careful for the potential risk of adhesion in giant ovarian tumors.

The present authors, for the first time provided detailed data regarding serum D-dimer and DVT of 18 patients with giant ovarian tumors. Unexpectedly, DVT developed only in three (16.7%) cases. Considering that the group ≥ 10,000 grams had more incidence of DVT than group < 10,000 grams, we should pay more attention to the risk of DVT when tumors increase in the weight.

In case 18, the present authors could not insert the filter for the prevention of DVT before surgery because of the closure of inferior vena cava by tumor pressure, but they inserted it under general anesthesia. Thus, the collaboration with cardiologists and anesthetists is indispensable for the management of patients before surgery.

Out of 18 cases of giant ovarian tumors, 14 cases (77.8%) originated from the left ovary. The present authors could not determine the statistical significance about the site of tumor location due to the paucity of cases. If a collaborative study about the site of tumors is conducted with other institutes, and giant ovarian tumors are found to be more frequently originated from the left site, this information would be useful at surgery because the identification and ligation of left ovarian arteries and veins after adhesiolysis proceeded from the left side may reduce blood loss weight during surgery. Further study is necessary to elucidate the pathology and intra- and postoperative complications.

Previous case reports regarding giant ovarian tumors showed the difficulties in the management of intra- and postoperative complications, such as cardiac failure, respiratory failure, and bleeding. Th present results demonstrated the importance of the careful preoperative preparations for patients with giant ovarian tumors and the possibility for the preoperative selection of high-risk patients.

The present authors conclude that much attention should be paid to patients with giant ovarian tumors who were confined to bed more than 50% of waking hours (PS 3 or 4) and that aggressive surgery is recommended due to a frequent incidence of cancer.

References

[1] Alobaid A., Memon A., Alobaid S., Aldakhil L.: "Laparoscopic management of huge ovarian cysts". *Obstet. Gynecol. Int.*, *2013*, 380854.
[2] Salem HA.: " Laparoscopic excision of large ovarian cysts". *J. Obstet. Gynaecol. Res.,* 2002, *28*, 290.
[3] Manchanda R., Kriplani A.: "Giant malignant ovarian tumor: a case report". *Int. J. Gynecol. Cancer*, 2005, *15*, 1135.
[4] Nakamura M., Saitoh M., Miyamoto S., Kubo Y., Tomita H., Andoh A.: "Case of a giant mucinous ovarian carcinoma with bone metastasis". *J. Obstet. Gynaecol. Res.*, 2005, *31*, 576-578.
[5] Yanazume Y., Yoshinaga M., Yanazume S., Kamikihara T., Tokunaga M., Kamio M., *et al.*: "Giant ovarian cancer weighing 100 kg with poor prognosis". *J. Obstet. Gynaecol. Res.*, 2007, 33, 91-94.
[6] Kim Y.T., Kim J.W., Choe B.H.: "A case of huge ovarian cyst of 21-year-oldyoungwoman". *J. Obstet. Gynaecol. Res.*, 1999, *25*, 275-279.
[7] Kondi-Pafiti A., Bakalianou C., Dastamanis C., Papadias K., Iavazzo C., Liapis A.: "A giant ovarian mucinous cystic neoplasm weighing 8,500 grams with functional stroma. A case report and literature review". *Eur. J.Gynaecol. Oncol.*, 2009, 30, 704-706.
[8] Kobayashi H., Sumimoto K., Kitanaka T., Yamada Y., Sado T., Sakata M., *et al.*: "Ovarian endometrioma—risks factors of ovarian cancer development". *Eur. J. Obstet. Gynecol.Reprod.Biol*., 2008, *138*, 187.

[9] Ottesen M., Rose M.: "Giant ovarian tumor masked by obesity". *Acta Obstet. Gynecol. Scand.*, 1994, *73*, 349.
[10] Karaman A., Azili M.N., Boduroğlu E.C., Karaman I., Erdoğan D., Cavuşoğlu Y.H., *et al.*: "A huge ovarian mucinous cystadenoma in a 14-year-old premenarchal girl: review on ovarian mucinous tumor in premenarchal girls". *J. Pediatr. Adolesc. Gynecol.,* 2008, *21*, 41.
[11] Cevik M., Guldur M.E.: "An extra-large ovarian mucinous cystadenoma in a premenarchal girl and a review of the literature". *J. Pediatr. Adolesc. Gynecol.*, 2013, *26*, 22.
[12] Ueda S., Yamada Y., Tsuji Y., Kawaguchi R., Haruta S., Shigetomi H., *et al.*: "Giant abdominal tumor of the ovary". *J. Obstet. Gynaecol.Res.*, 2008, *34*, 108.

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