**Fertility-sparing surgery for borderline ovarian Brenner tumor and subsequent childbirth: First case report and literature review**

Giulia Garofaloa1\*MD, Dario Bucellaa1MD, Dominique Thomasa MD, Frederic Buxanta MD, PhD

aGynaecology and Ultrasound department, Ixelles Hospital, Université Libre de Bruxelles, Rue Jean Paquot 63, 1050 Ixelles, Belgium

Corresponding author: Dr Giulia Garofalo, Rue Jean Paquot 63, 1050 Ixelles, Belgium, Obstetrics and Gynaecology Department, Tel: 02. 739.85.85, Fax: 02.641.4220

E-mail: [giuliagarofalo@yahoo.it](mailto:giuliagarofalo@yahoo.it)

ORCiDs: <https://orcid.org/0000-0003-0728-2066>

Word count: 1078

Declarations of interest: none

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Informed consent was obtained for manuscript and the image.

GG: study conception, data collection, data analysis, manuscript writing and approval

DB: data interpretation, direct patient care, manuscript revision and approval

TD: data interpretation, direct patient care, manuscript revision and approval

FB: study conception, manuscript revision, supervision and approval

1Present address: University Hospital Saint Pierre, Rue Haute 320, 1000 Brussels, Belgium

**Abstract**

Borderline ovarian Brenner tumors are rare, mainly diagnosed manopause. We reported in a previous article the first pregnancy after a fertility sparing surgery. We now report the first baby birth after unilateral salpingo-oophorectomy for a borderline ovarian Brenner tumor and a review of the literature on fertility sparing surgery.

**Keywords**

Brenner tumor; fertility preservation; ovarian neoplasm; childbirth; case report

1. **Introduction**

Borderline ovarian Brenner tumors (BOBTs) represent less than 0,01% of all ovarian cancers. Patients with BOBTs are usually asymptomatic and the diagnosis is accidental. They have an excellent prognosis and the average age at presentation is 50[1]. Few cases are published on fertility sparing surgery (FSS) on premenopausal women with BOBTs and to our knowledge no case of baby birth has been described afterwards. We have described in a previous article the first case of spontaneous pregnancy after laparoscopic unilateral salpingo-oophorectomy (USO) for a BOBT, performed in a 40 years old woman, in order to preserve her fertility [2]. We present here the first baby birth after USO for a BOBT and a review on FSS for BOBTs.

1. **Case report**

We have reported in 2019 the first and only case of spontaneous pregnancy after a laparoscopic USO for BOBTs (FIGO stage 1A)in a woman at 40 years old at the moment of the transvaginal scan [2]. The patient got spontaneously pregnant less than three months after the surgery, but no information about the follow-up of the pregnancy and its outcome was given on this publication since she was only at the second trimester of the pregnancy.

The follow-up of the pregnancy was fine and she gave birth to a baby girl at term by caesarean section, since the patient did not wish a vaginal delivery after a previous caesarean section. The contralateral ovary was normal and no implant was seen at the examination during the caesarean section (Figure 1). The baby girl was 3020 grams at birth and had good Apgar scores (9/10/10).

Against what stated in the previous article, neither an hysterectomy nor a controlateral USO were finally realised, in accord with the patient’s will. She is using a hormonal intrauterine device as contraception since the delivery. A close clinical and sonographic follow-up every 6-9 months was proposed, even if affected by the pandemic period. The follow-up has been normal and is at more than four years now from the first sonographic diagnosis.

1. **Discussion**

We reviewed three databases (Medline, LILACS, Central Cochrane Library) and we found seven case series and 15 case reports on BOBTs, with a total number of 70 cases.

Table 1 shows the overall BOBTs we found in the literature, the number of women with diagnosis at or before 40 years old and their subsequent cases of FSS and spontaneous pregnancy. Only two out of these women were treated with USO before or at the age of 40 [2,3].

Cuatrecasas et al. [4] reported a case of a woman at the age of 32 who underwent a total abdominal hysterectomy and a bilateral salpingo-oophorectomy (BSO), because the tumor was bilateral and FIGO 2A. Woodruff et al. [5] reported one case out of 10 women between 31 and 40 years old. However, as the author stated, all women underwent hysterectomy. Hence, no FSS was performed, even if in two cases USO was performed instead of a BSO. Three premenopausal cases were described by Miles et al. [3], treated with USO, but only for one case was the age of the woman known (30 years old). Because the average age in this series was 50 years, with a maximum age of 64, it is probably unlikely that the other two cases were diagnosed before 40. No information about their obstetrical follow-up was given.

Ziadi et al. [6] described the case of a BOBT in a woman of 43 who had been followed since the age of 30 for a recurrent low-grade papillary urothelial carcinoma. No FSS was performed.

Ricotta et al. [7] have recently published 17 cases of BOBTs, of which five have received a FSS and four were treated by laparoscopy. Interestingly two women had 81 and one 63 years old. The remaining two cases were 43 and 42 years old, respectively. However no data on follow-up were supplied for the first case. The second case, which was a BBOT with stromal microinvasion and stage IC1, showed recurrence at three years. No information about a possible pregnancy for this latter case is available, even if a pregnancy seems unlikely.

The good prognosis of BOBTs, as recently shown from a review [7] supports the performing of a FSS, however limits due to lack of data are evident. More evidence is available in the literature for serous and mucinous borderline tumors (SBOT and MBOT) even if only one randomized control trial exists [8]. Studies on SBOT and MBOT suggest that a bilateral cystectomy (BC) for bilateral tumors (mainly SBOT) or a USO (or even cystectomy) for unilateral tumors can be proposed. Conservative treatment can also be proposed after recurrences according to histology and stage. Recurrence rate is obviously higher in conservative treatment (2,9% for BSO, 12,2% for USO and 26,7% for cystectomy) but the overall survival does not change [9,10]. Thus, some authors do not endorse radical and/or completion surgery since recurrence rate is 10% after 10 years [10]. Whether FSS could be appropriate also for premenopausal women who had already completed childbearing is also controversial. Commonly follow-up is intensified in the first two years but there is no consensus on how to perform it [8-10].

We can expect similar results for BOBTs, but data on SBOT and MBOT are probably not sufficient to use the same surgical and clinical strategy. Moreover, the low prevalence of BOBTs and especially of cases with FSS, as shown in table 1, combined with the lack of strong studies preclude the possibility to make clear and powerful statements about FSS and prognosis for this tumors [1]. Nevertheless, in our case we opted for a laparoscopic FSS without a completion surgery. The clinical and sonographic follow-up at more than four years is normal, and has being done every 6-9 months, taking also into account the pregnancy and the pandemic period during the subsequent years. She is currently under hormonal intra-uterine device. Oral contraception could probably be a better option, however no recommendation has been found in the literature on contraception after FSS.

In conclusion we report the first case of baby birth after a FSS for a BOBTs, without a completion surgery and with a normal follow-up at more than four year. The review of the literature found 70 cases of BOBTs with an overall good prognosis, very few cases of FSS and only one case of subsequent spontaneous pregnancy [2]. If the patient wishes so, laparoscopic USO or cystectomy could be proposed, but further studies are needed.

1. **References**

[1]Uzan C *et al.,* 2012.Management and prognosis of borderline ovarian Brenner tumors. *Int J Gynecol Cancer*;22(8):1332-6.

[2]Garofalo G *et al.,* 2019 Conservative surgical treatment of a borderline ovarian Brenner tumour in a pre-menopausal woman with subsequent pregnancy: case report of a rare entity. J Obstet Gynaecol.Jul 13:1-2.

[3]Miles PA *et al.,* 1972. Proliferative and malignant Brenner tumors of the ovary. Cancer;30:174Y176.

[4]Cuatrecasas M, *et al.,* 2009*.* Transitional cell tumors of the ovary: a comparative clinicopathologic, immunohistochemical, and molecular genetic analysis of Brenner tumors and transitional cell carcinomas. Am J Surg Pathol;33:556Y567.

[5]Woodruff JD *et al.*, 1981. Proliferative and malignant Brenner tumors. Review of 47 cases. Am J Obstet Gynecol.15;141(2):118-25.

[6]Ziadi S *et al*., 2010. Bilateral proliferating Brenner tumor of the ovary associated with recurrent urothelial carcinoma of the urinary bladder. N Am J Med Sci. 2010;2:39–41.

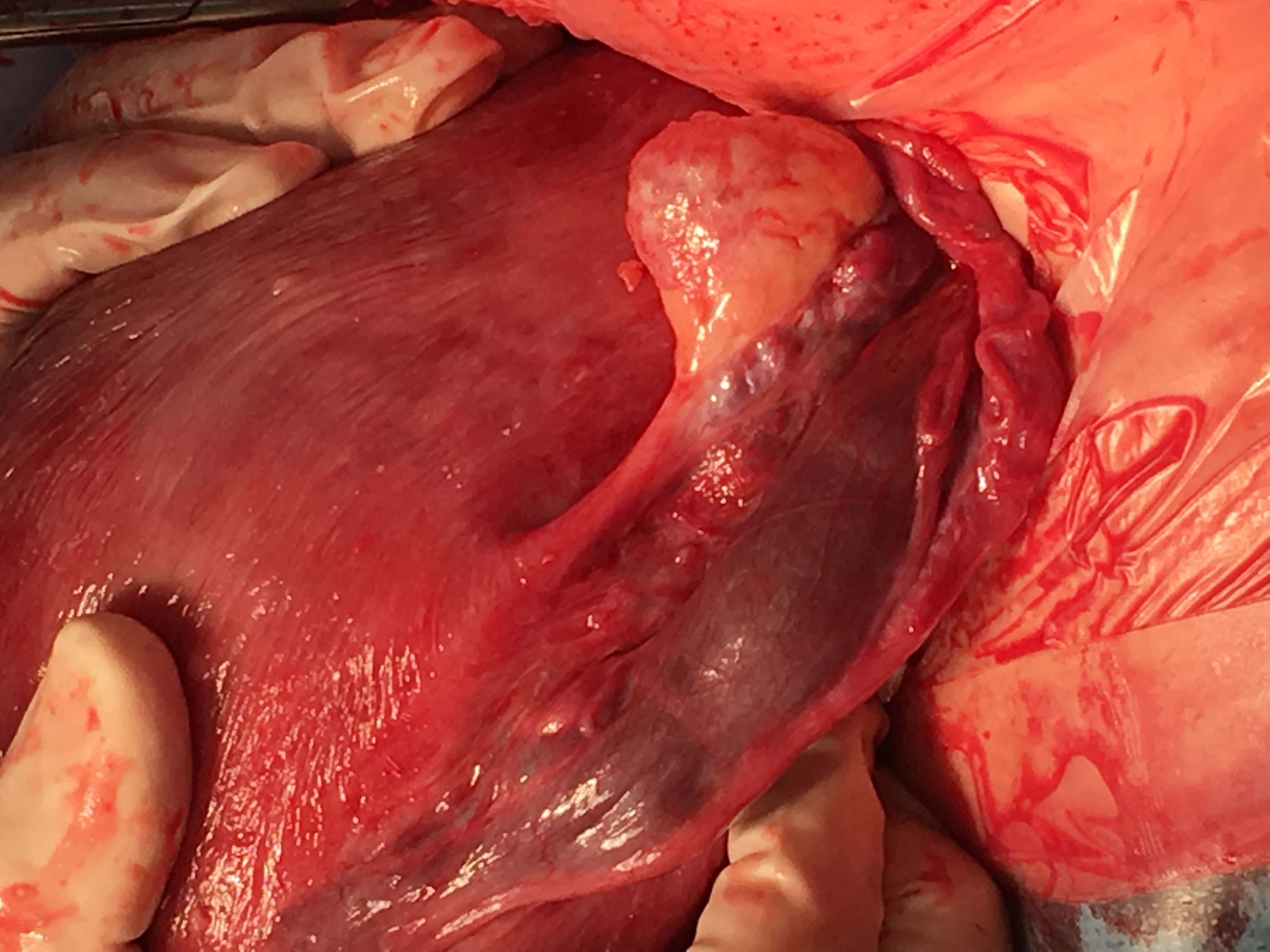
[7]Ricotta G *et al*., 2021. Brenner Borderline Ovarian Tumor: A Case Series and Literature Review. Ann Surg Oncol. 2021 Oct;28(11):6714-6720.

[8]Palomba S *et al.,* 2010. Ultra-conservative fertility-sparing strategy for bilateral borderline ovarian tumours: an 11-year follow-up. Hum Reprod. 25(8):1966-72.

[9]Hannibal CG *et al.,* 2017. A nationwide study of ovarian serous borderline tumors in Denmark 1978-2002. Risk of recurrence, and development of ovarian serous carcinoma. Gynecol Oncol;144(1):174-180.

[10]du Bois A *et al.,* 2013. Arbeitsgmeinschaft Gynäkologische Onkologie (AGO) Study Group. Borderline tumours of the ovary: A cohort study of the Arbeitsgmeinschaft Gynäkologische Onkologie (AGO) Study Group. Eur J Cancer;49(8):1905-14.

**Figure 1**



Contralateral ovary at C-section

**Table 1:** Overall BOBT: cases under 40 years with FSS and subsequent pregnancy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Article | Cases (n.) | Diagnosis ≤ 40 years | fertility sparing surgery | Pregnancy |
| Hallgrìmsson *et al.* 1972 | 7 | 0 | - | - |
| Miles *et al.* 1972 | 7 | 1a | Yes | NK |
| Woodruff *et al.* 1981 | 10 | 1 | No | - |
| Svenes *et al*. 1984  Roth *et al.* 1985 | 1  6 | 0  0 | -  - | -  - |
| Hermanns *et al.* 2000  Cuatrecasas *et al.* 2009 | 1  7 | 0  1 | -  Nob | -  - |
| Uzan *et al.* 2012 | 10 | 0 | - | - |
| Dierickx *et al.* 2012 | 2 | 0 | - | - |
| Takahama *et al.* 2004 | 1 | 0 | - | - |
| Chia *et al.* 2009 | 1 | 0 | - | - |
| Wang *et al.* 2010 | 1 | NK | - | - |
| Ziadi et al. 2010  Aoun *et al.* 2014 | 1  1 | 0  0 | -  - | -  - |
| De Cecio *et al.* 2014 | 1 | 0 | - | - |
| Klasa *et al.* 2014 | 1 | 0 | - | - |
| Morales-Palacios *et al.* 2016 | 1 | 0 | - | - |
| Albu *et al.* 2016 | 1 | 0 | - | - |
| Garofalo *et al.* 2019  Salibay et al. 2021  Ricotta et al. 2021  Yuksel *et al.* 2022 | 1  1  17  1 | 1  0  0  0 | Yes  -  -  - | Yes  -  -  - |
| Total | 70 | 4 | 2 | 1 |
| a median age 50 (three premenopausal and one at 30 years)  bFIGO 2A, bilateral  NK: not known | | | | |