Clinical Images and Case Reports Journal

Case Report | Vol 4 Iss 1

Tubo-Ovarian Teratoma: MRI Essential Problem-Solving Tool? Case Report and Review of Literature

Valeria Fiaschetti[1], Nicolò Ubaldi[2*], Stefania Fosi[3], Carla Marani[4], Maria Emanuela Natale[4], Giuseppe Sorrenti[5] and Roberto Floris[3]

[1]University Tor Vergata, Rome, Italy – Diagnostic Imaging Department, European Hospital, Rome, Italy

[2]University La Sapienza Rome, Italy – Radiology Operating Unit, Sant'Andrea Hospital, Rome, Italy

[3]Diagnostic Imaging, Interventional Radiology and Radiotherapy Department - Tor Vergata Policlinic, Rome, Italy

[4]Operative Unit of Pathological Anatomy and Cytodiagnostics - San Carlo of Nancy Hospital, Rome, Italy

[5]Operative Unit of Gynecology - San Carlo of Nancy Hospital, Rome, Italy

[*]**Corresponding author:** Nicolò Ubaldi, University La Sapienza Rome, Italy – Azienda Ospedaliera Sant'Andrea Hospital, Rome, Italy. E-mail: ubaldi.nicolo@gmail.com

Received: January 27, 2022; **Accepted:** February 06, 2022; **Published:** February 25, 2022

Abstract

The combination of ovary and tubal teratoma is exceptionally uncommon, in fact only a handful of cases have been reported in literature. In this case report we would like to not only illustrate a tubo-ovarian mature teratoma in a pre-menopausal woman, but also elucidate our pre-operative diagnostic approach, utilizing ultrasound (US) first and magnetic resonance imaging (MRI) after. In literature, no study on tubal teratoma has concentrated on the diagnostic work-flow to correctly characterize and identify the origin of the neoformation, necessary to reach a comfortable diagnosis prior to surgery. As a matter of fact, tubarian teratomas have been diagnosed either by chance during routinary transvaginal ultrasound (TVUS) examinations, or incidentally during surgical procedures and subsequently confirmed by histopathological analysis.

Differently from what previously recounted in other papers on tubal teratoma focusing more on the surgical aspects, this is the first case-report providing detailed MR diagnostic image findings, that could help other doctors whenever encountering such an ambiguous tumor. Our aim was to culminate this gap: we dedicated time to comprehensively characterize, classify and identify the origin of the lesion exclusively through diagnostic images, and route the diagnosis to a very probable ovary-tubaric teratoma, thus facilitating the surgical planning.

Keywords: Tubo-ovarian; Teratoma; Magnetic resonance imaging; Laparoscopy; Case report; Teratoma images; Pathology

Introduction

It is rare to encounter tumors of the fallopian tube as these represent <1% of all gynecological tumors, interestingly, within this low percentage of prevalence, it is more frequent to find primary cancer than benign tumors of the fallopian tube [1]. If on one hand teratomas are frequent tumors originating in the ovaries (mature teratomas account for up to 50% of all ovarian neoplasms in women younger than 40 years of age) [2], on the other hand it is rather exceptional to find tubarian teratomas. Actually, to date only 73 cases have been reported in literature [3]. Teratomas are germ cell tumors that form during embryonic development, they can be either mature or immature and the latter are most prevalently cancerous. On the other hand, mature teratomas (mainly dermoid cysts) that are composed of either two or all three germinal layers, have less than 2% probabilities of transforming into malignant tumors.

Beyond the subtle symptomatology associated to fallopian tube teratomas, such as infertility, menstrual irregularities, or abdominal pain [4], in the past no examination has allowed clinicians to either correctly diagnose tubal teratoma preoperatively or at least give a strong direction towards the diagnosis of the specific tumor. In fact, tubarian teratomas have been diagnosed either by chance during routinary pelvic ultrasound or incidentally during surgical procedures and subsequently confirmed by histopathological analysis [5]. Of notice, tubarian teratomas are usually found in the isthmus or ampulla region [6].

Therefore, we hereby would like to fill the gap in literature regarding diagnostic knowledge of tubo-ovarian teratoma, by reporting our approach utilizing ultrasound first and MRI later, in identifying the neoformation prior to histological examination. Differently from what recounted in previous papers, the detailed MR images allowed us to characterize with detail the lesion and identify with high probability the origin. Hopefully, in the future doctors will refer to these images when in doubt. It is important to say that due to the absence of a large body of clinical knowledge, this type of tumor highlights the challenges for clinicians in guiding diagnostic, treatment and management options.

Case Report

We hereby present a premenopausal 52-year-old woman with two previous births. No previous laparotomies; only uterine fibromas have been found at TVUS. The patient presented to our clinic with acute pelvic pain in the right iliac fossa region. From there, she was advised to do a complete trans-abdominal US that in turn highlighted a large round lesion in that same region. Specifically, we detected a 52 × 42 mm heterogeneous hyperecogenic mass at the level of the small pelvis in front of the bladder, together with free fluid collected around the lesion (Figure 1). Unfortunately, the US was not conclusive in finding the exact origin and type of the tissue characterizing the neoformation. For this reason, with this case report we would like to give weight on a fundamental diagnostic tool, MRI, that allowed us to characterize the origin, nature and complications of the neoformation. In literature, no tubal teratoma has been diagnosed pre-operatively, commonly because of its low incidence, elusive symptomatology and its high mutability rate, resulting in frequent evasion. Therefore, this case-report would like to highlight the importance of MRI examination in approaching specifically the correct diagnosis prior to histology confirmation. This would allow clinicians to gain time and help tackle more efficiently the tumor in order to plan the best surgical strategy possible.

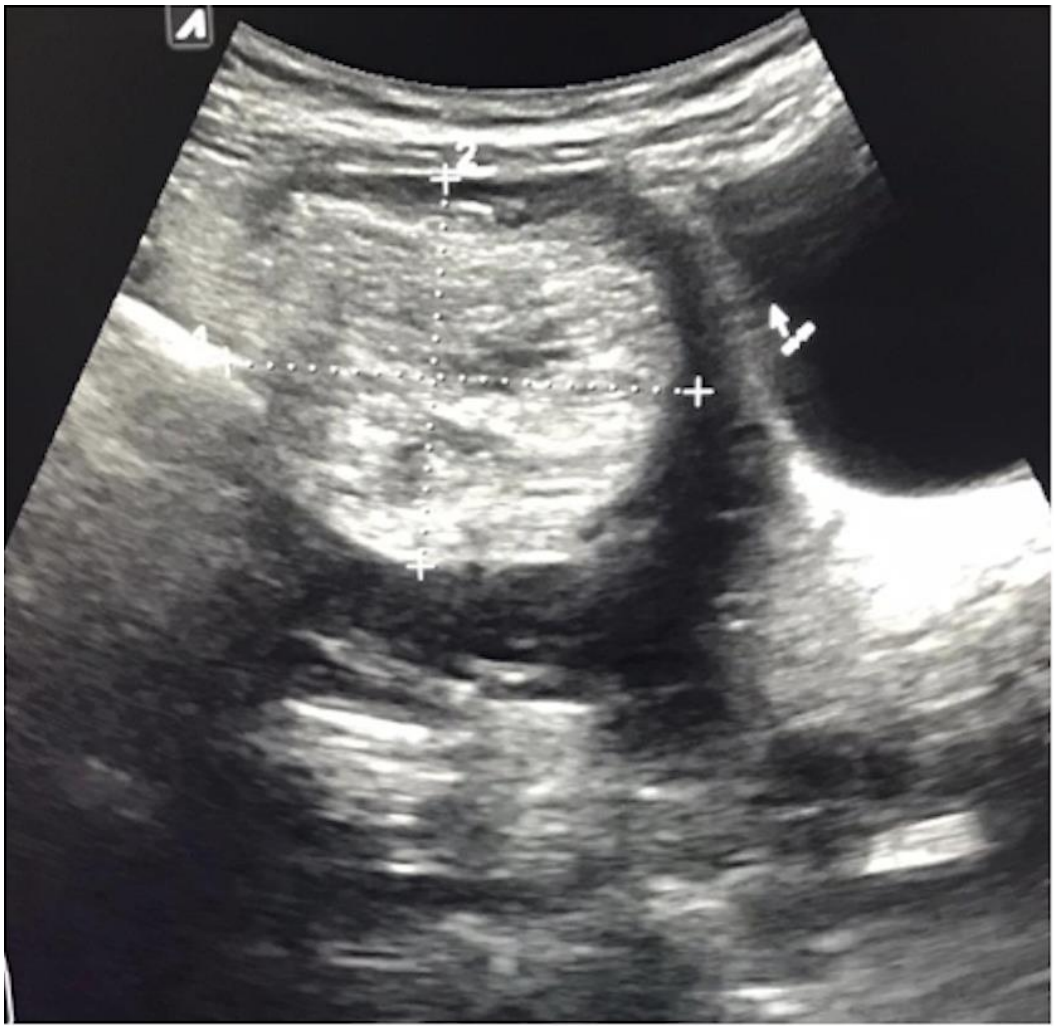

Figure 1: Ultrasonography: Uneven neoformation with prevalent hyperecogenicity surrounded by corpuscolated fluid collection, anterior to the bladder (arrow).

MR pelvic scans were obtained using a 1.5 T MR (Achieva, Philips medical systems, BEST, Netherlands) with a phased-array coil dedicated to pelvic evaluation. MRI examination was performed by T1, T2-weighed and fat suppression sequences and completed with DWI and dynamic sequences before and after administration of intravenous contrast. We found at the level of the pelvic excavation above the bladder, a gross neoformation of 7.8 x 5 x 5.5 cm with regular margins and uneven signal intensity with greater representation of hyperintense tissue in both T1 and T2 sequences, that however appeared to completely fade away in the fat suppression sequence, suggesting the presence of adipose tissue in the context (Figure 2). Nevertheless, the administration of contrast highlighted strengthening around the solid regions in addition to restriction in DWI sequences (Figure 2).

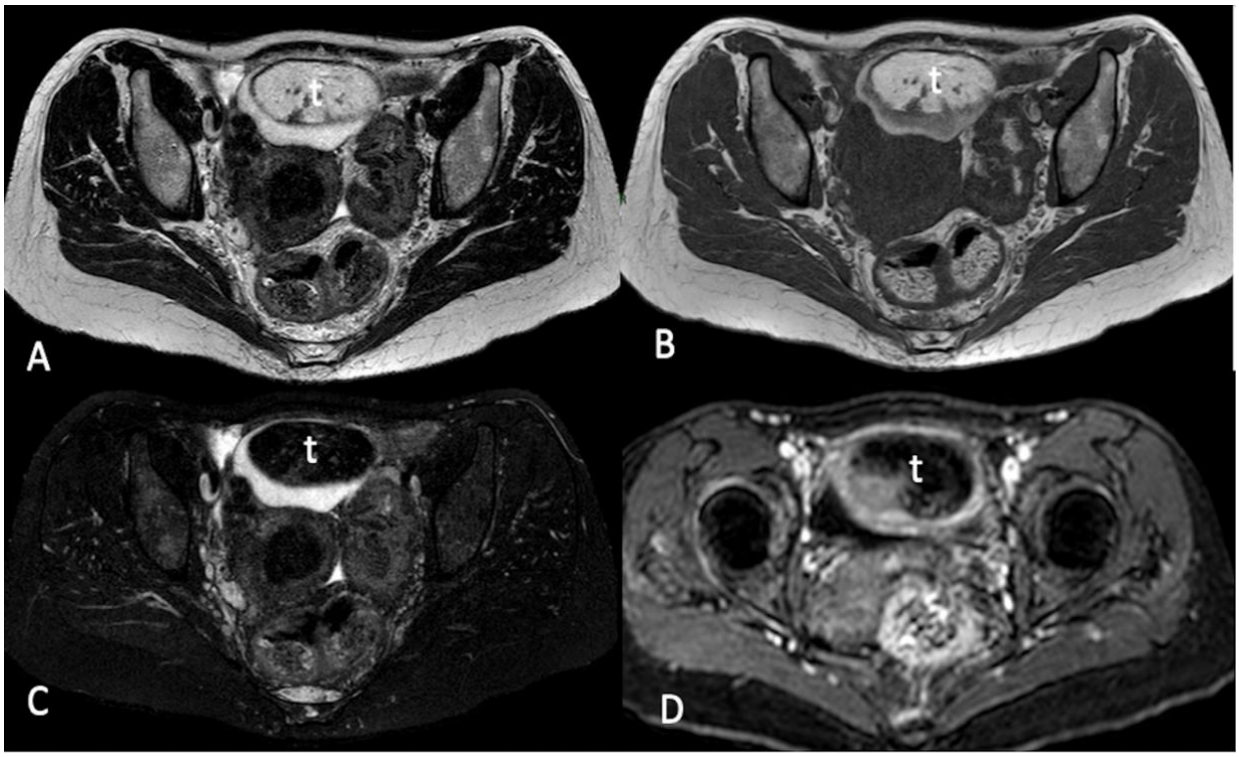

Figure 2: Gross neoformation with regular margins and uneven signal intensity with greater representation of hyperintense tissue in both T1 and T2 sequences **(A,B),** that however appeared to completely fade away in the fat sat sequence **(C),** in addition to contrast enhancement exclusively in the solid portion **(D).**

A: axial T2; **B:** axial T1; **C:** axial T2 STIR; **D:** T1 fat suppression post-contrast; t: teratoma

The characteristics of signal strength and contrast enhancement appear suggestive for disembrogenic formation type "dermoid cysts" or "teratoma". The formation appeared to be completely surrounded by a fluid component (partly hemorrhagic) in a sac-like arrangement with thin walls (3.5mm) that continued cranially towards the left fundic uterine lateral margin hinting hydro-hematosalpynx (Figure 3). In fact, the mass most likely caused the obstruction of the tube with consequent hematohydrosalpinx accumulation.

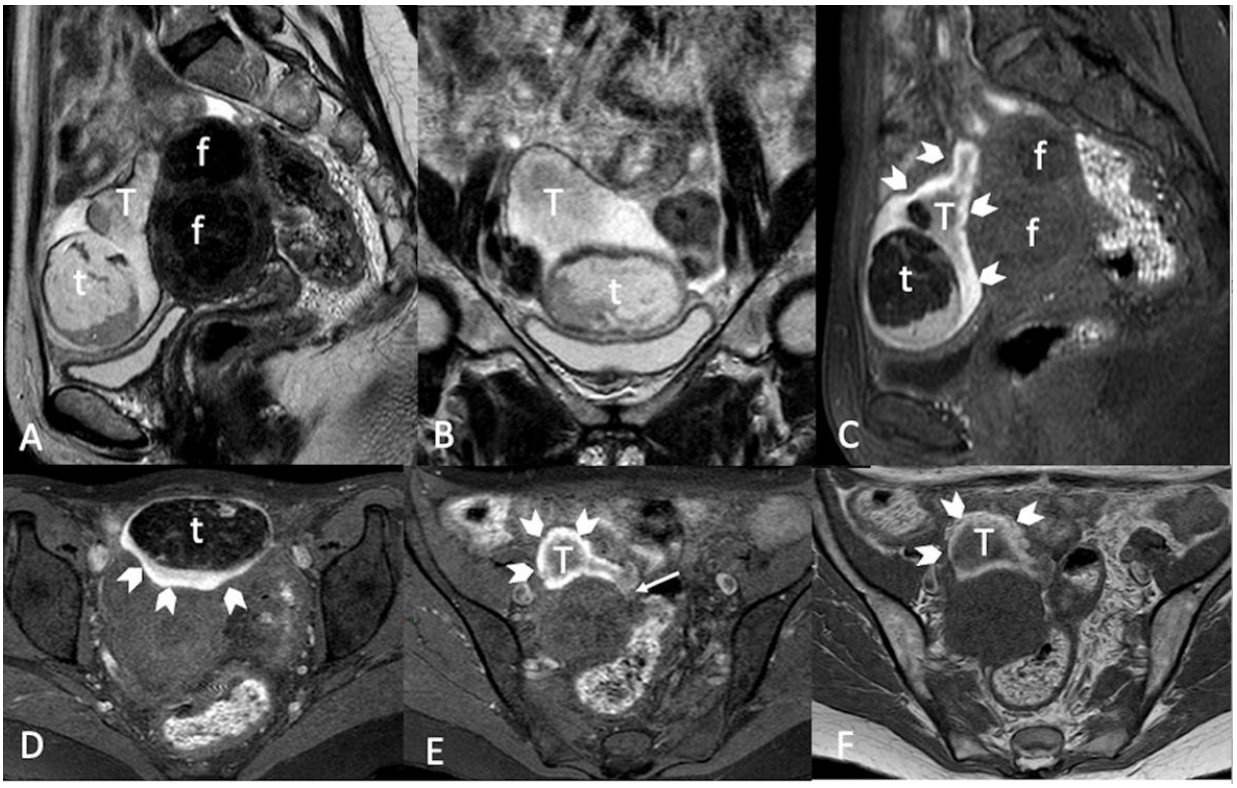

Figure 3: Neoformation completely surrounded by a fluid component (partly hemorrhagic) **(A, B)** in a sac-like arrangement with thin walls (3.5mm) that continued cranially towards the left fundic uterine lateral margin hinting hydro-hematosalpynx **(C, D, E, F)**. Hyperintense signal distributed peripherally in mainly in T1 fat sat **(F)**. Also present multiple myometrial myomas.

A: sagittal T2; **B:** coronal T2; **C:** sagittal T1 STIR; **D and E:** axial T1 STIR; **F:** axial T1; t: teratoma; f: fibromyoma; T: tube; pointed arrows: blood collection; arrow: tubo-ovarian ostium

The ovarian parenchyma was not recognizable, the fimbrae were dilated consequently to its obstruction, therefore we assume the neoformation to origin from the tubo-ovarian junction. Furthermore, also the bladder was implicated, as it appeared compressed and dislocated at the bottom by the neoformation described, in addition to the presence of thin fluid layer in the Douglas pouch and in the peri-uterine area. In conclusion, we have exploited MRI as a pre-operative tool for diagnosing the neoformation of right tubo-ovarian relevance, most likely of disembriogenetic nature (dermoid cyst/ teratoma), that was nonetheless confirmed through surgery and histological examination.

The patient underwent a hysterectomy with bilateral salpingoopherectomy through laparoscopy, in relation to her extensive uterine fibromatosis (Figure 4).

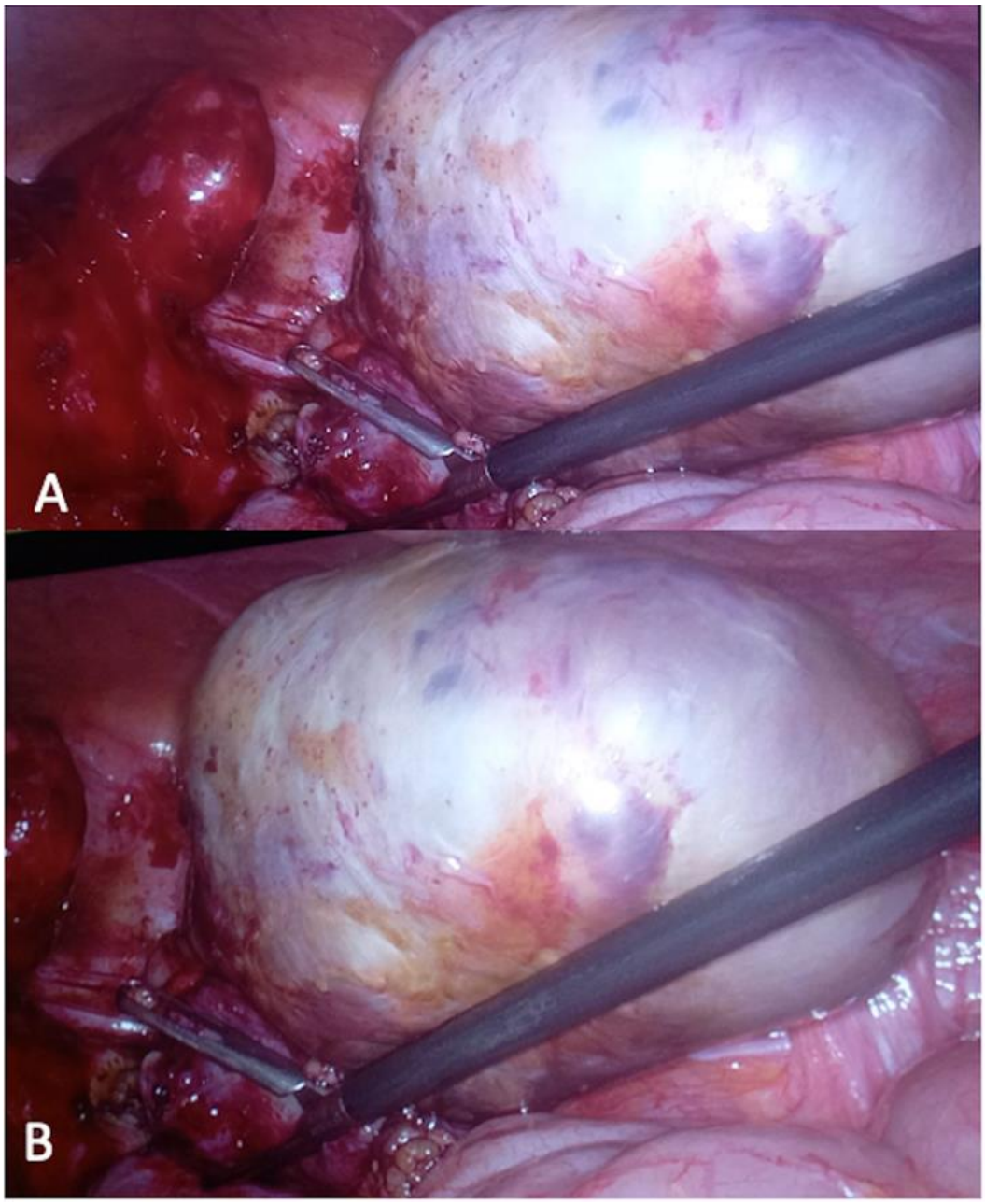

Figure 4: Laparoscopy: tubo-ovarian neoformation in addition to a dilated and hemorrhagic tube.

The macroscopic analysis revealed a deformed uterus of 100 x 65 x 75 mm due to the presence of intramural, subserosal and submucosal whitish roundish neoformations, of hard-elastic consistency, with a maximum diameter varying from 5 mm to 50 mm. At the opening, the cervix and endometrial cavity were normal.

On the left: tubal length of 40 mm free from significant histological alterations; ovarian size of 20 x 16 x 7 mm containing a functional cyst.

On the right: a 50 mm long tube tenaciously adherent and partly fused with the ovary of which its dimensions were 75 x 70 x 45 mm. The latter was totally replaced by a cystic formation with thin walls containing greenish mucoid material with hair inside. In correspondence to the adhesion with the tube, there was a wide area of hemorrhage.

Furthermore, microscopically we reported a mature tubal-ovarian cystic teratoma, almost totally necrotic, with widespread haemorrhagic infarction and with extensive areas of fibrosis, calcification and chronic granulomatous flogosis containing multinucleated giant cells. In conclusion, the endometrium was atrophic (Figure 5).

The postoperative follow-up was uneventful and the patient was discharged soon after.

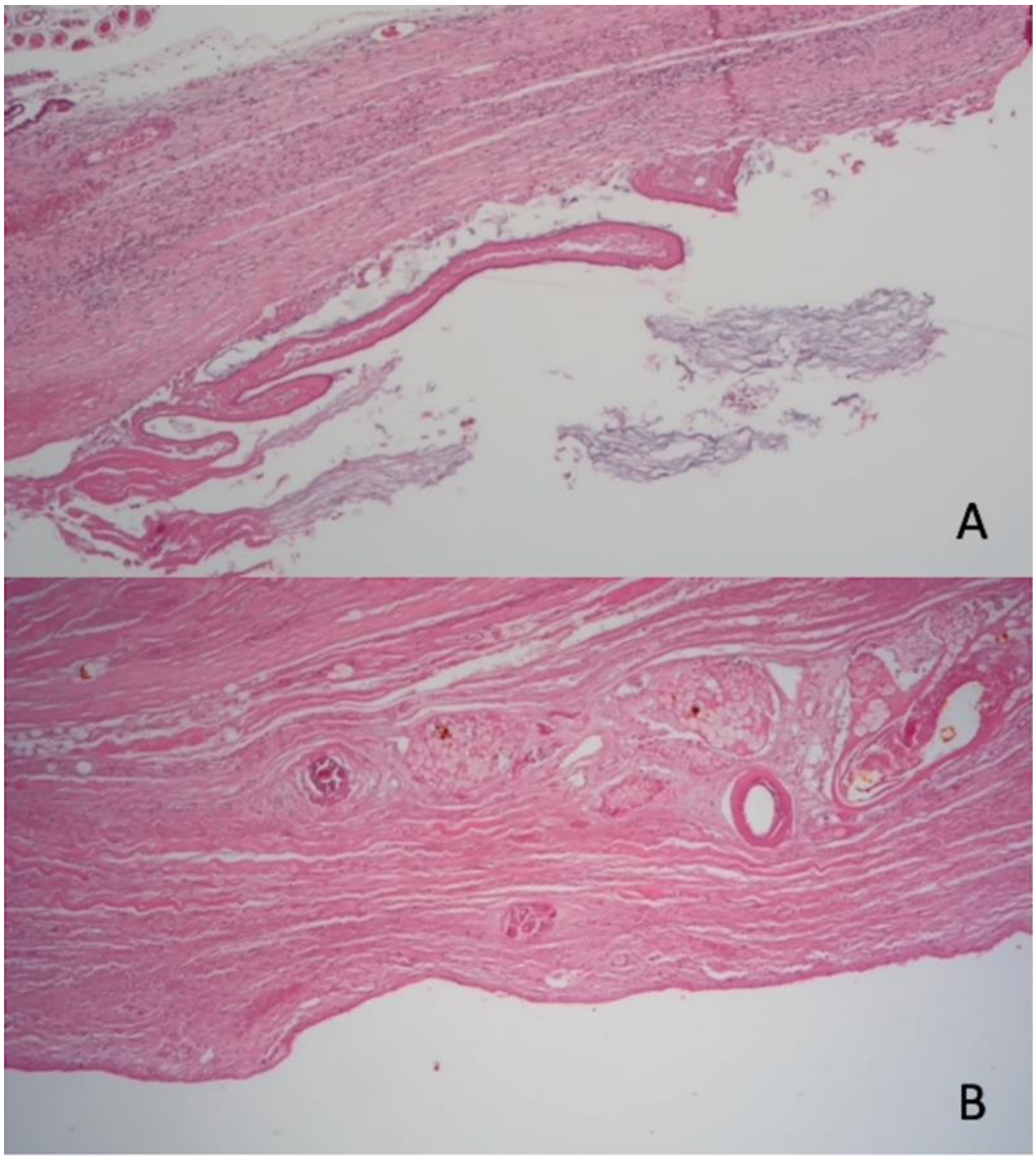

Figure 5: On histological examination the cyst appears covered with squamous epithelium with underlying sebaceous glands and hair follicles. Cross-section of the tumor shows the microscopic appearance of the cyst and fimbrial-like area **(A)** and the microscopic appearance of the cyst in addition to the solid area **(B).**

Discussion

Established Facts

Primary fallopian tube carcinoma is the rarest cancer of the female genital tract, only less than 1% of all gynecological malignancies are typically classified as primary fallopian tube carcinomas [7] of which the most frequent are adenocarcinomas [8]. Benign tumors of the fallopian tube are even less common, the majority being adenomatoid tumors, however when considering ovarian teratomas it is important to highlight their predominance within benign ovarian tumors.

Ovary-fallopian tube teratomas most commonly pass unnoticed, it is rare to point out their presence after targeted diagnostic examinations, mainly because these tumors do not give away signs of their existence. A precocious sign of fallopian tube obstruction is infertility whereas tubal torsion usually appears over time. Notably, more than two-thirds of women diagnosed with tubal teratoma are infertile [9]. The methods used for the detection of this neoplasm include ultrasonography, hysterosalpingography, CT scan, MRI, and laparoscopy. However, tubal teratomas are usually not preoperatively diagnosed also due to the limited literature illustrating diagnostic information, such as detailed images with descriptions, useful for guidance. Actually, to date no author has prompted their research content on the preoperative diagnosis approach of a tubarian teratoma, in fact all cases have been identified incidentally during routinary US gynecological examinations or surgical procedures [5].

Novel Insights

In doubt of a suspicious malignant lesion of the ovary/tube, it may be useful to proceed with MRI examination in order to assess in more detail the mass and the origin of the neoformation, therefore bring forth an insight of the diagnosis prior to histology. The integration of MRI, superior contrast resolution, multiplanar imaging and the characteristic signal intensity findings of common pathologies such as dermoid tumors, is fundamental in distinguishing normal tissue from a tumor, specifically when lower-level resolution examinations are not capable of giving detailed information [10]. It is of uttermost importance to integrate a third level diagnostic examination such as MRI to examine any suspicious lesion at US, in order to characterize and deepen the information necessary to identify the correct origin before entering the operating theater. In this way we allowed surgeons to plan the removal more efficiently in terms of time and technical planning.

In conclusion, this report described a 52 years old patient with a mature teratoma originating at the level of the right fallopian tube in addition to the ovary itself. Tubal teratomas are extremely rare. To date, this is the first case-report discussing teratoma that places attention on the pre-operative diagnostic workflow. In fact, we have augmented to the existing literature on teratoma, precious detailed MR image findings of this specific tumor and MR could help in diagnosing prior to surgery such an ambiguous tumor. Although the incidence of tubal teratomas is extremely low, it is necessary to be aware of this possibility and MRI should be the examination of choice for the characterization, origin identification of the neoformation and for the planning of surgery.

Statement of Ethics: This study protocol has been reviewed and approved by the independent ethical committee board of Polyclinic Foundation of University Tor Vergata on 28/12/2021 “Reference number 258/21”.

REFERENCES

1. Meral Rexhepi, Elizabeta Trajkovska, Hysni Ismaili, et al. Primary Fallopian Tube Carcinoma: A Case Report and Literature Review. Open Access Maced J Med Sci. 2017; 15: 344-348.
2. Comprehensive Cytopathology (Third Edition), 2008.
3. G Khatib, AB Guzel, Kucukgoz GU, et al. Mature cystic teratoma of the fallopian tube. J Obstet Gynaecol. 2013; 33: 120-124.
4. Mustafa Erkan Sari, Ozhan Ozdemir, Pinar Kadirogullari, et al. Mature cystic teratoma of the fallopian tube in a postmenopausal woman: A case report and review of the literature. Case Rep Obstet Gynecol. 2015; 2015: 583021.
5. Jongchul Baek. Synchronous occurrence of mature cystic teratoma of the fallopian tube and ovary: A case report. Oncol Lett. 2016; 12: 911-914.
6. Yanpeng Wang, Lifeng Chen, Heping Shen, et al. Fimbrial teratoma presenting as ovarian cyst. J Minim Invasive Gynecol. 2021; 28: 1265-1266.
7. Mark Baekelandt, Anne Jorunn Nesbakken, Gunnar B. Kristensen, et al. Carcinoma of the fallopian tube. Cancer. 2000; 89: 2076-2084.
8. C Schneider, E Wight, D Perucchini, et al. Primary carcinoma of the fallopian tube: A report of 19 cases with literature review. Eur J Gynaecol Oncol. 2000; 21: 578-582.
9. G Khatib, AB Guzel, U Kucukgoz-Gulec, et al. Mature cystic teratoma of the fallopian tube. J Obstet Gynaecol. 2013; 33: 120-124.
10. Mahesh Shetty. Nonovarian mimics of ovarian malignancy. Semin Ultrasound CT MR. 2019; 40: 319-331.