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WHEN TWO BENIGN OVARIAN PATHOLOGIES COLLIDE: AN INCIDENTAL BILATERAL COLLISION TUMOUR OF MATURE CYSTIC TERATOMA AND ENDOMETRIOMA

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ABSTRACT

Ovarian collision tumours are rare entities defined by the coexistence of two histologically distinct neoplasms, most commonly reported within the same ovary, while bilateral involvement is extremely uncommon and often under-recognised. Endometriomas are common benign ovarian lesions in women of reproductive age and may be asymptomatic or incidentally detected, whereas mature cystic teratomas are the most frequent ovarian germ cell tumours and are often discovered unintentionally during imaging or surgery. We report the case of a 27-year-old woman in whom adnexal lesions were incidentally identified, with no significant gynaecologic symptoms at presentation. Pelvic magnetic resonance imaging (MRI) showed bilateral ovarian masses, and surgical exploration revealed distinct ovarian lesions involving both ovaries. Histopathological examination confirmed a mature cystic teratoma in one ovary and an endometrioma in the contralateral ovary. This unusual and incidental bilateral presentation highlights the limitations of preoperative imaging in detecting synchronous ovarian pathologies and underscores the importance of thorough intraoperative assessment and definitive histopathological evaluation. Increased awareness of this rare entity is essential to optimise surgical management, fertility preservation and follow-up.

KEYWORDS

Ovarian collision tumours, mature cystic teratoma, endometrioma

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LEARNING POINTS

- Ovarian collision tumours are rare pathological entities, and presentations involving histologically distinct tumours in different ovaries are extremely uncommon.
- This case adds to the limited literature by illustrating an atypical and largely incidental presentation with non-specific symptoms.
- Such variability in clinical and radiologic presentation underscores the diagnostic complexity of these tumours and the potential for under-recognition.
- Although advanced imaging, particularly MRI, may provide important diagnostic clues, definitive diagnosis relies on a comprehensive histopathological assessment.
- Awareness of this unusual presentation is crucial, as early recognition of bilateral but distinct ovarian tumours can influence surgical planning, fertility-preserving strategies and follow-up, ultimately improving individualised patient care.

INTRODUCTION

Mature cystic teratomas (MCTs) are the most frequent ovarian germ cell tumours, typically occurring in women of reproductive age. These benign lesions contain fully developed tissues from all three germ layers: ectoderm, mesoderm and endoderm. MCTs are bilateral in roughly 10% of cases. Approximately one-fifth of MCTs are discovered incidentally, while symptomatic cases may present with complications such as torsion, rupture or infection and, rarely, malignant change[1,2]. Ovarian collision tumours are rare pathological entities characterised by the coexistence of two histologically distinct neoplasms occurring either within the same ovary or, less commonly, involving different ovaries. The most frequently reported combinations include MCT and epithelial ovarian tumours, while coexistence with ovarian endometriomas (OEs) remains distinctly uncommon[1,3]. The pathogenesis of these tumours is not fully understood and may involve coincidental synchronous tumour development or shared local environmental factors. We present an unusual case of an incidentally detected bilateral ovarian collision tumour, consisting of a MCT in one ovary and a contralateral endometrioma. This case highlights the atypical and asymptomatic nature of such presentations, underscores the limitations of preoperative imaging in identifying synchronous ovarian pathologies and emphasises the importance of comprehensive intraoperative assessment and histopathological confirmation. The diagnostic and clinical implications of this rare presentation are discussed, with particular attention to surgical decision-making and fertility preservation in young women.

CASE DESCRIPTION

A 32-year-old premenstrual woman presented to the clinic with complaints of dyspnoea and vomiting. She reported no abdominal pain, constipation, menstrual irregularities or fertility concerns. She also denied fever, chills, diarrhoea, dysuria, cough or vaginal bleeding. A physical examination and vital signs were unremarkable and routine laboratory tests, including complete blood count, metabolic panel and liver enzymes, were within normal limits. She also denied any recent sexual activities. The chest X-ray was normal; she was sent for an abdomino-pelvic ultrasound to rule out possible cholelithiasis. The radiologist found two incidental masses during the examination that prompted further evaluation by magnetic resonance imaging (MRI) and computed tomography (CT) scan. A CT scan of the abdomen and pelvis showed incidental bilateral ovarian masses *(Fig. 1)*.

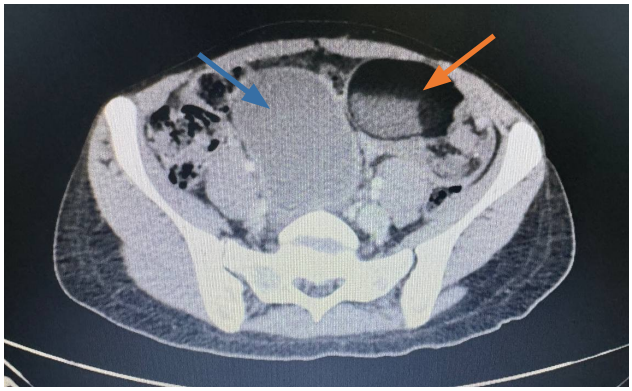


Figure 1. *Axial CT scan of the pelvis showing a large left adnexal mass showing a fatty component, related to a teratoma (orange arrow). There is also a right cystic ovarian lesion (blue arrow).*

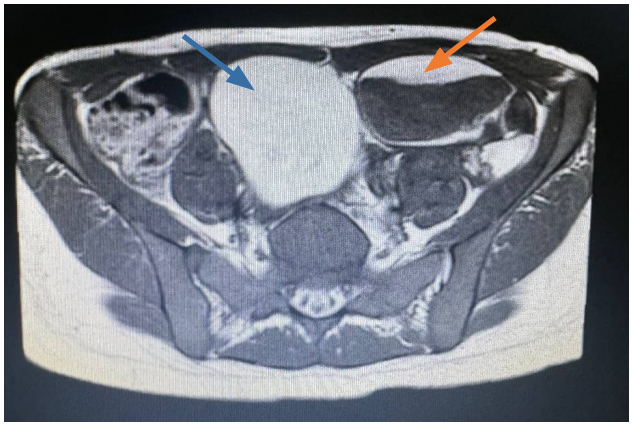


Figure 2. *Axial MRI of the pelvis showing a left large adnexal lesion (orange arrow), which shows a hyperintense T2 signal related to fat and calcifications and representing a teratoma. A right large centrally located adnexal cyst (blue arrow) shows a hyperintense T2 signal representing a cyst.*

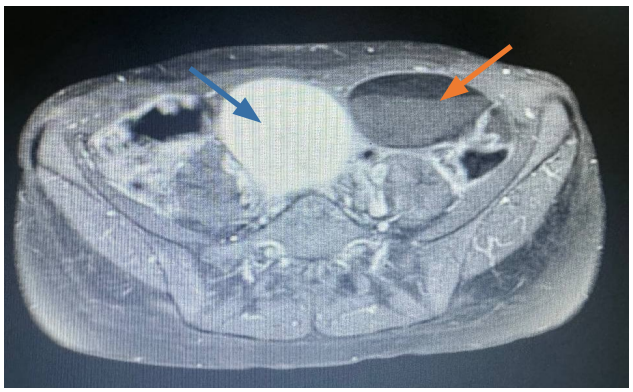


Figure 3. Axial MRI T1 image showing suppression of signal within the left adnexal mass, representing a fat component within the teratoma (orange arrow). There is a large cystic lesion showing a hyperintense T1 signal on the right, related to a haemorrhagic component, suggesting an endometrioma (blue arrow).

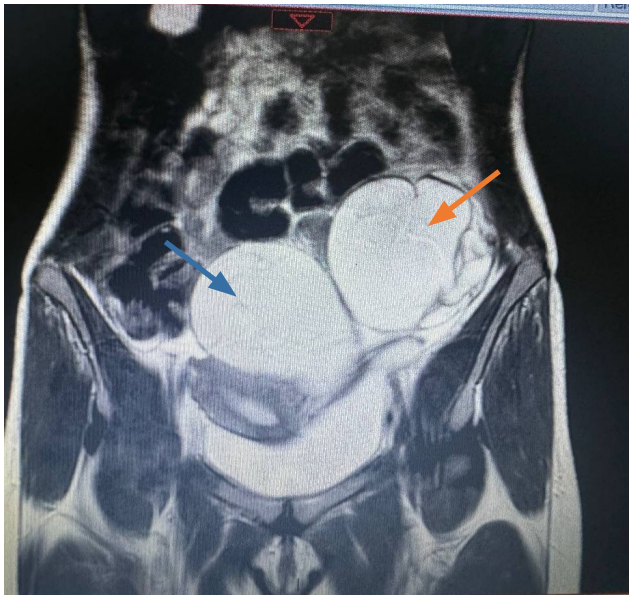


Figure 4. Coronal T2 MRI sequence showing a hyperintense T2 mass in the left adnexa, representing a teratoma (green arrow). There is also a right cystic adnexal mass showing a hyperintense T2 signal (blue arrow).

An MRI of the abdomen and pelvis showed a well-circumscribed right adnexal mass, centrally and paracentrally located in the right adnexa and deep pelvis, measuring 12.6 × 6.5 cm. It showed hyperintensity on T2 and T1 sequences, hypo intensity on short tau inversion recovery and hyperintensity on T1 spectral presaturation with inversion recovery, with a postero-inferior component that was isointense on all sequences and did not enhance after gadolinium injection. These features are suggestive of a haemorrhagic cyst. The MRI also showed a left adnexal mass that was heterogeneous, multiloculated and multi-septated, containing cystic, solid, fatty and calcified components, measuring 8.6 × 4.8 cm, consistent with a teratoma *(Fig. 2, 3 and 4)*. Tumour markers, including CA-125 and CA 19-9, were within normal limits and there were no signs of torsion, rupture or malignancy. Given the patient's reproductive age, she underwent a fertility-preserving open cystectomy. Intraoperatively, both ovaries were carefully inspected, and the masses were successfully excised while preserving ovarian tissue *(Fig. 5)*. Histopathology confirmed an MCT in the left ovary and an endometrioma in the right ovary, with no malignancy. Histopathological examination confirmed a mature cystic teratoma in the left ovary and an endometrioma in the right ovary, with no evidence of malignancy. The postoperative course was uneventful, and the patient was discharged home in a stable condition.

DISCUSSION

MCTs, also referred to as ovarian dermoid cysts, are the most common ovarian germ cell tumours and predominantly affect women of reproductive age, although they may occur at any stage of life. Pathologically, MCTs arise from fully differentiated germ cells originating from all three embryonic layers. Ectodermal elements such as skin, hair follicles and sebaceous glands are nearly universal. Histologically, these tumours are classically lined by stratified squamous epithelium and surrounded by ovarian stroma, most often forming a unilocular cyst containing sebaceous material and a Rokitansky nodule that may harbour hair, teeth or other differentiated tissues[2].

Although the exact pathogenesis remains unclear, reported associations include menstrual irregularities, infertility, low parity, late menarche, alcohol intake and physical activity. MCTs demonstrate a right-sided predominance and are bilateral in a minority of cases[2].

Malignant transformation is rare, occurring in 1–2% of MCTs, and predominantly affects postmenopausal patients. Squamous cell carcinoma is the most frequently reported histologic subtype[2].

Endometriosis is a chronic, oestrogen-dependent disorder characterised by ectopic endometrial-like tissue, resulting in persistent inflammation. It commonly affects the ovaries, fallopian tubes and pelvic peritoneum, and is associated with pelvic pain and infertility. The disease manifests as superficial peritoneal implants, OEs or deep infiltrating nodules[4].

OEs represent a more advanced form, consisting of cystic lesions lined by endometrial-like tissue. These 'chocolate cysts' contain thick, dark fluid from repeated haemorrhage and are linked to reduced ovarian reserve and impaired reproductive outcomes. Infertility affects 30–50% of patients and is multifactorial. Clinically, patients may be asymptomatic or present with dysmenorrhoea, menorrhagia, dyspareunia, chronic pelvic pain, gastrointestinal or urinary symptoms during menstruation, pelvic mass effect or infertility. Laboratory evaluation may include complete blood count, CA-125, urinalysis and STI screening to exclude alternative diagnoses[4].

Collision tumours, defined as the presence of two histologically distinct neoplasms in the same site, most often involve MCTs and serous cystadenomas, but coexistence with endometriomas is rarely reported[1]. In

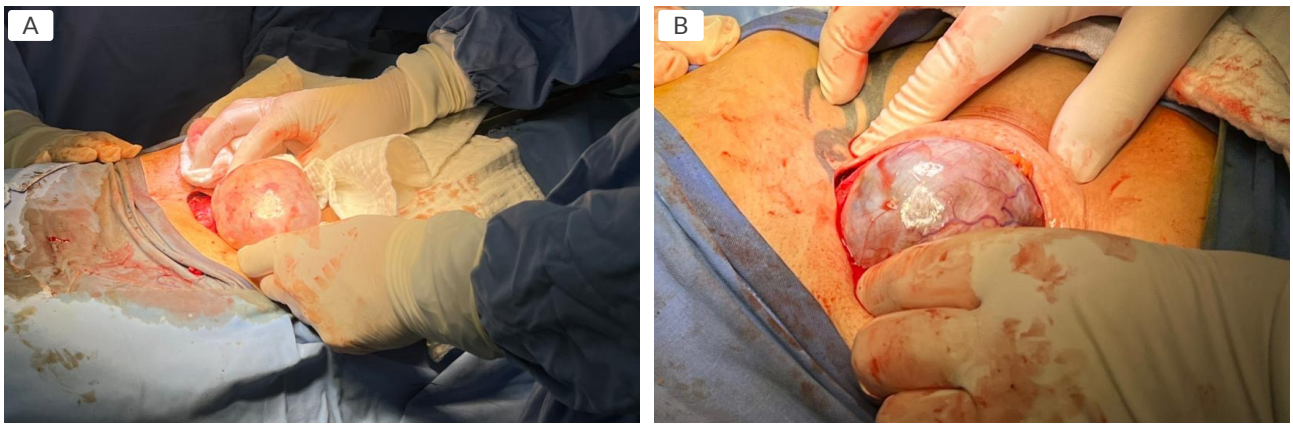


Figure 5. A) Intraoperative gross view of the left ovary showing the teratoma; B) Intraoperative gross view of the right ovary showing the endometrioma.

a case series, a total of 49 patients with coexisting ovarian endometrioma and MCT were analysed, including 19 newly reported cases and 30 from the literature. The mean age was 32.3 ± 8.1 years (range 20–59), and 66.7% (26/39) were nulliparous. The most common clinical presentation was abdominal pain (27/49, 55.1%), followed by dysmenorrhoea (11/49, 22.4%), abdominal mass or distension (12/49, 24.5%), primary infertility (7/49, 14.3%), menstrual disturbances (4/49, 8.2%), dyspareunia (3/49, 6.1%), vaginal bleeding (3/49, 6.1%) and an incidental diagnosis in six patients (12.2%)[1].

The mean largest diameter of MCTs was 53.1 ± 21.2 mm, and for endometriomas this was 50.7 ± 24 mm. Regarding laterality, MCTs were equally distributed between the right and left ovaries (19/43 each, 44.2%), with five cases (11.6%) being bilateral. Endometriomas were more commonly left-sided (24/43, 55.8%) than right-sided (16/43, 37.2%), with three cases (7%) being bilateral. Both lesions were present in the same ovary in 24 patients (49%), in opposite ovaries in 17 patients (34.7%) and in both the same and different ovaries in eight patients (16.3%)[1].

Preoperative tumour markers were available in some cases: mean CA-125 was 47.2 ± 23.3 U/ml, and mean CA 19-9 was 40.8 ± 39.8 U/ml. Although benign, these lesions occasionally present with elevated tumour markers, warranting surgical intervention. Overall, collision tumours of MCT and endometrioma predominantly occur in women of reproductive age, often with fertility concerns, and cystectomy with a minimally invasive approach is preferred when feasible[1].

In a cohort study, mature teratomas were identified in 288 patients (8.2%), while immature teratomas were rare (9 patients, 0.3%). The mean age of women with mature teratomas was 38.0±13.3 years compared with 30.9±11.1 years in those with immature teratomas. A significant association was observed between mature teratomas and struma ovarii (1.4%, p=0.001), with an additional positive correlation between struma ovarii and thecoma (0.3%). Coexisting malignancy in mature teratomas was uncommon, with endometrioid ovarian carcinoma and borderline tumours each occurring in 0.3% of cases. Benign coexisting lesions included serous cystadenoma (4.9%), mucinous cystadenoma (2.4%), endometriomas (2.8%), ovarian fibroma (1%), Brenner tumour (1%), endometriosis (0.7%) and thecoma (0.3%). Among immature teratomas, serous cystadenoma was observed in one case (11.1%). Overall, Pearson's analysis demonstrated a predominantly negative linear relationship between mature teratomas and other gynaecologic tumours, consistent with the rarity of reported collision tumours in the literature, most commonly involving mucinous and serous cystadenomas[3].

Another study aimed to evaluate the association between ovarian teratomas and endometriomas. The authors retrospectively analysed 315 women with endometrioma and 172 women with ovarian teratoma. Among teratomas, MCTs accounted for 98% (168/172), immature teratomas for 2% (4/172) and struma ovarii for 8.1% (14/172). Endometriomas were significantly more frequent in the left ovary (65.4%) than the right (34.6%). The most common presenting symptoms were pelvic pain and/or a palpable adnexal mass in women with teratomas, and infertility and pelvic pain in those with endometriomas. In contrast to endometriomas, teratomas were more frequently right-sided (57% vs. 32.5% left-sided), suggesting distinct pathogenetic mechanisms. The left-sided predominance of endometriomas may be due to anatomical factors, including the presence of the sigmoid colon, which limits peritoneal fluid flow on the left side, allowing refluxed endometrial tissue to implant more easily, and the potential for firmer adhesions in the left pelvis that facilitate lesion growth, whereas the laterality pattern of teratomas supports a different underlying pathophysiology[5].

Both tumours can also coexist on the same ovary as two distinct lesions[6]. Furthermore, even though collision tumours occur as two distinct pathologies within the same location, the existence of the teratoma within the endometrioma, as a composite endometrioma–MCT, has been reported in the literature highlighting the difficulty in the diagnosis of such tumours[7]. Although a collision tumour, which refers to two different tumours occurring at the same location, is rare, a combination of three tumours (benign mucinous cystadenoma and MCT of the right ovary

together with endometrioma of the left ovary) has also been described in a case report[8].

Although both types of ovarian tumours are most commonly found in premenopausal women, a case of collision tumour of teratoma and endometrioma within the same ovary in a postmenopausal woman has been described[9].

In one of the largest available series, 72 cases of postmenopausal endometriosis were identified over a 12-year period, with cystic ovarian endometriosis being the most common presentation, accounting for 79.2% of cases. The median age at diagnosis was 58.5 years. Although the pathogenesis of endometriosis in postmenopausal women remains incompletely understood, several mechanisms have been proposed. The most widely accepted theories include oestrogen production from extra-ovarian sources, such as the adrenal glands and adipose tissue, as well as reactivation of pre-existing endometriotic lesions[9]. Ovarian endometriosis has been widely implicated in malignant transformation. Evidence suggests an increased risk of ovarian cancer, particularly in cases of atypical endometriomas or lesions exceeding 10 cm[8].

MRI and transvaginal ultrasonography (USG) are the imaging modalities most frequently used to diagnose endometriosis. Transvaginal USG has an 88% sensitivity and a 90% specificity in differentiating endometriomas from other ovarian masses. OEs typically appear as unilocular cysts with homogeneous low-level internal echoes, described as a 'ground-glass' appearance, with minimal or absent Doppler vascularity[4]. The sensitivity and specificity of MRI imaging in the evaluation of endometriosis are 96.3% and 100%, respectively[6]. Transabdominal or transvaginal ultrasonography is usually the first-line imaging modality for MCTs. These lesions most commonly appear as hyperechoic ovarian masses with posterior acoustic shadowing due to sebaceous material, hair or calcified components such as bone or teeth. Lesions containing predominantly liquid sebaceous material may appear hypoechoic. Additional sonographic features include echogenic mural projections corresponding to Rokitansky nodules and characteristic fat–fluid levels. Despite these findings, differentiation from haemorrhagic cysts, endometriomas or mucinous cystic neoplasms can be challenging, particularly in large or complex cases[10]. A CT scan can readily identify intralesional fat with attenuation values of −20 Hounsfield units or less and is useful for detecting mural nodules or calcifications. It provides additional anatomical detail and is particularly helpful when MRI is unavailable or contraindicated[2].

Notably, approximately 7% of MCTs lack detectable fat or calcifications, and in 1–2% of cases – especially in large lesions – imaging features may be complex and mimic malignancy. These limitations underscore the importance of correlating imaging with histopathologic examination for definitive diagnosis[2,10].

On MRI, cystic teratomas typically present as large unilocular pelvic cysts containing a solid mural nodule, known as the Rokitansky protuberance, arising from a thin cyst wall and projecting into the lumen. The diagnosis is established on T1-weighted and fat-suppressed T1-weighted sequences by demonstrating fat suppression and characteristic fat–fluid levels, with the sebaceous component appearing hyperintense on T1-weighted images[2,10].

Surgical excision is the treatment of choice for MCT, with the operative approach guided by patient age, symptoms, tumour size, radiologic characteristics and fertility considerations. Laparoscopic cystectomy is widely favoured in premenopausal women due to its minimally invasive nature, reduced postoperative morbidity and preservation of ovarian function. However, it carries an increased risk of intraoperative cyst rupture and spillage, which may result in chemical peritonitis or adhesion formation. Oophorectomy is generally recommended in postmenopausal women, in cases of large tumours, extensive ovarian involvement or when malignancy is suspected. Recurrence after cystectomy occurs in approximately 4–5% of cases, highlighting the need for long-term follow-up. Spontaneous rupture of MCTs is uncommon but may lead to chemical peritonitis. Risk factors include torsion with infarction, pregnancy-related pressure and abdominal trauma. While minimally invasive surgery offers clear advantages over laparotomy, reported rates of cyst rupture during laparoscopy vary widely, underscoring the importance of meticulous surgical technique. Ovarian-sparing surgery is considered when there is absence of lymphadenopathy or distant metastases, with normal tumour markers and no radiologic features suggestive of malignancy[2,4].

Current European Society of Human Reproduction and Embryology (ESHRE) guidelines recommend surgical intervention before assisted reproductive techniques only in women with OEs larger than 3 cm, and solely to alleviate symptoms or improve follicular accessibility. Definitive surgery with hysterectomy and bilateral salpingo-oophorectomy may be considered in patients not desiring fertility. Cystectomy is associated with lower recurrence and higher spontaneous pregnancy rates but significantly risks ovarian reserve, with anti-Müllerian hormone (AMH) declines of ~36% for unilateral and ~49% for bilateral lesions. Risks are higher in older patients and those with large or bilateral cysts[4].

In this case, the clinical presentation was atypical and relatively subtle, with non-specific symptoms that did not initially suggest the presence of multiple synchronous ovarian tumours. MRI showed distinct tumours involving different ovaries, highlighting the diagnostic complexity and potential for under-recognition in such presentations. The absence of striking clinical features and the lack of definitive preoperative imaging findings contributed to the incidental nature of the diagnosis, which was ultimately established only after surgical exploration and histopathological examination. Furthermore, while the

literature shows that endometrioma is more likely to occur on the left side and teratoma on the right, our case had an opposite location of the tumours, making it rare. The bilateral yet histologically distinct ovarian involvement posed important considerations for surgical management, particularly given the patient's young age and the need to balance adequate treatment with ovarian preservation. This case underscores the importance of thorough intraoperative assessment of both ovaries and emphasises that even seemingly unilateral adnexal pathology may conceal synchronous lesions. The findings illustrate how ovarian collision tumours can present in an unexpected and incidental manner, reinforcing the need for heightened clinical vigilance in the evaluation of complex adnexal masses.

CONCLUSION

Ovarian collision tumours are rare pathological entities, and presentations involving histologically distinct tumours in different ovaries are exceedingly uncommon. This case adds to the limited literature by illustrating an atypical and largely incidental presentation with non-specific symptoms. Such variability in clinical and radiologic presentation underscores the diagnostic complexity of these tumours and the potential for under-recognition. Although advanced imaging, particularly MRI, may provide important diagnostic clues, definitive diagnosis relies on comprehensive histopathological assessment. Awareness of this unusual presentation is crucial, as early recognition of bilateral but distinct ovarian tumours can influence surgical planning, fertility-preserving strategies and follow-up, ultimately improving individualised patient care.

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