Intraoperative Appearance of Endosalpingiosis: A Single-Center Experience of Laparoscopic Findings and Systematic Review of Literature

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Abstract: Background: Endosalpingiosis is assumed to be the second most common benign peritoneal pathology after endometriosis in women. Although recent studies indicate a significant association with gynecologic malignancies, many underlying principles remain unclear. This work aimed to systematically describe the intraoperative appearance of endosalpingiosis. Methods: Data and intraoperative videos of patients with histologically verified endosalpingiosis were retrospectively reviewed. The main outcome measures were macroscopic phenotype and anatomical distribution. Additionally, a systematic review searching PubMed (Medline) and Embase was conducted. Results: In the study population (n = 77, mean age 40.2 years (SD 16.4)), the mean size of lesions was 3.6 mm and the main visual pattern was vesicular (62%). The most frequent localization was the sacrouterine ligaments (24.7%). In the systematic review population (n = 1174 (210 included studies overall), mean age 45.7 years (SD 14.4)), there were 99 patients in 90 different studies with adequate data to assess the appearance of the lesions. The mean size of the lesions was 48.5 mm, mainly with a cystic visual pattern (49.5%). The majority of the lesions affected the ovaries (23.2%), fallopian tubes (20.4%), or lymph nodes (18.5%). Comparing this study to the literature population, the main differences concerned the size \( (p < 0.001) \) and main visual patterns \( (p < 0.001) \) of lesions. Conclusions: The usual intraoperative findings of endosalpingiosis appeared less impressive than described in the literature. In our study population, lesions of a few millimeters in size with a vesicular appearance were mostly seen, most frequently in the sacrouterine ligament area. Intraoperative recognition by the gynecologic surgeon and histologic diagnosis should play an important role in further understanding this entity, scientifically and clinically.

Keywords: endosalpingiosis; mullerianosis; endosalpingiosis morphology; endosalpingiosis distribution; laparoscopy; minimal-access surgery

1. Introduction

Endosalpingiosis is the ectopic presence of a fallopian tube-type glandular epithelium and has a prevalence of ~7% in premenopausal women [1,2]. Described by Sampson in 1930 as “post-salpingectomy endometriosis”, endosalpingiosis has long been perceived as an insignificant incidental finding, and thus the relevance of this condition remains largely unknown [3].

Endosalpingiosis is the second most common peritoneal disease in women following endometriosis, the most common representative of the condition known as mullerianosis [4]. These two entities occur concurrently in about 30–40% of cases [1,5]. A comparative study showed that endosalpingiosis does not have a chronic inflammatory nature and does not cause infertility or chronic pelvic pain compared with endometriosis [1]. The etiology remains unexplained for both to date; analogous theories have been discussed such as retrograde menstruation, metaplasia of the coelomic epithelium, embryonic misplacement, and hematogenous or lymphomatous dissemination [4,6]. Apart from exceptions
where extensive lesions are revealed on imaging, endosalpingiosis is usually detected intraoperatively.

However, recent work indicates that endosalpingiosis is associated with gynecological tumors including uterine and ovarian neoplasia; among the latter, especially serous borderline, clear cell, invasive mucinous tumors, and endometrioid cancer subtypes [5,7], sharing similar molecular pathomechanisms [8].

Systematic descriptions of macroscopic appearance are sparse, making it difficult to recognize the lesions and distinguish them from endometriosis or other findings intraoperatively. Similar reference works as for endometriosis hardly exist [9].

Here, we systematically investigated the intraoperative macroscopic phenotype and anatomical distribution of endosalpingiosis based on an own patient population and a systematic literature review.

2. Materials and Methods

2.1. Own Population

The study was designed in compliance with the STROBE checklist [10]. Data and intraoperative videos of patients with endosalpingiosis undergoing a laparoscopy between 2007 and 2020 in the Department of Obstetrics and Gynecology of Cantonal Hospital Schaffhausen were examined. Exclusion criteria were a lack of histologically verified endosalpingiosis and missing or insufficient intraoperative video material. Every included video was reviewed by two reviewers independently (AM, NS). In cases of disagreement between the two reviewers, a third reviewer (LB) was invited to participate, and the consensus was reached by discussion.

2.2. Sample Size Calculation

The minimum required sample size was calculated based on the study by Hesseling et al. [2], presumably the most comprehensive description of intraoperative findings in endosalpingiosis to date, versus a review of the current literature data. According to these data, lesions of 1 to 10 mm in diameter seem most frequent in clinical routine. This is in line with our experience and in contrast to the literature, where mostly larger findings of 4–5 cm have been reported. Regarding the anatomical distribution, in the study by Hesseling et al., the majority of lesions were in the pouch of Douglas with 69%, whereas only 7% were seen there in the literature review. In consideration of these findings, assuming a statistical power of 80% (p = 0.05), at least 18 participants in each group were required to describe the macroscopic phenotype, or eight for the anatomic distribution.

2.3. Systematic Review Population

This systematic review was conducted according to the PRISMA Guidelines [11]. The study protocol was registered in PROSPERO (CRD42022303171). The search for eligible studies was conducted in two databases (PubMed, Medline, and Embase) using a combination of the following MeSH terms as an electronic search algorithm: Endosalpingiosis OR Mullerianosis OR Endometriosis after salpingectomy. Reference lists of relevant articles and associated reviews were manually searched to identify papers not captured in the electronic search. Original studies (cohort studies, case-control studies, case reports) concerning humans in any language were considered for inclusion. Studies were included if their focus was on endosalpingiosis and if they contained information about the macroscopic appearance and/or the anatomical distribution. Exclusion criteria were an insufficiently precise description of the appearance (in words or pictures), missing anatomical information, or a lack of histological confirmation.

If the same cases were included in more than one publication (e.g., abstract and full-text manuscript), only the publication with the most detailed information was considered. Abstracts providing information about the macroscopic presentation and anatomical distribution of endosalpingiosis were considered eligible if no full-text manuscript was available.
The main search was conducted independently by three investigators (LB, DRK, NS) for the relevant literature published until 31 December 2021. Discrepancies were resolved by consensus. In addition to information on the general characteristics of the studies (authors, year of publication, journal, design, number of patients), the following parameters were recorded in standardized Excel spreadsheets.

2.4. Parameters

In both the own population and the systematic review population, the clinicopathological characteristics of the patients (e.g., age, parity, menopausal status, previous abdominal or gynecological surgery, indication for surgery, concurrent endometriosis and/or cancer) were recorded.

The primary endpoint was the macroscopic phenotype of endosalpingiosis lesions; the secondary endpoint was the anatomical localization.

The appearance of the lesions from patients was described in terms of the shape, color, height, surface area, consistency, associated calcifications/adhesions/fibrosis, and histological presence of endometriosis in the same lesions. On this basis, lesions were allocated into five main visual patterns (types 1–5: vesicular, polypous, fimbrial-like, cystic, and unusual). This classification has been described previously by our group (Figure 1) [12].

| Type | Description |
|------|-------------|
| 1    | Vesicular, small, round, transparent vesicles |
| 2    | Polypous, light or dark red polypes with smooth surface |
| 3    | Fimbrial-like, opaque, skin-colored bumps, resembling fimbrial epithelium |
| 4    | Cystic, small or big cysts, which form a cystic sac |
| 5    | Unusual, all other manifestations |

Figure 1. Based on the morphologic criteria, lesions were classified into five visual patterns.
2.5. Statistical Analysis

Statistical analyses were performed with IBM SPSS Statistics 27 (Endicott, NY, USA). For the categorical data, the Chi-square test was used; for continuous data, the Mann–Whitney U test was used. \( p \)-values < 0.05 were considered statistically significant.

2.6. Quality Assessment Systematic Review

Quality assessments for the included studies were conducted independently by three reviewers (LB, DRK, NS). Quality assessment for the observational cohort studies was performed using the Newcastle–Ottawa Scale and, for case reports, the JBI critical appraisal checklist for case reports [13,14].

2.7. Patient and Public Involvement

Apart from the retrospectively recorded, anonymized laparoscopic images and clinicopathological data of patients of the own population, there was no patient or public involvement in this study. Patient consent was obtained for the anonymous re-use of the data and intraoperative images. Approval for research was obtained from the local ethics committee (2020-02718). There are no conflicts of interest to declare.

3. Results

3.1. Own Population

3.1.1. Demographic Data—Age, Parity, Menopause, Reasons for Surgery

In our study group, we found 77 patients with histologically verified endosalpingiosis. The mean age was 40.2 years (SD 16.4), and the mean BMI was 24.1 kg/m\(^2\) (SD 5.7). Most (75.3%, \( n = 58 \)) patients were premenopausal. Most (59.7% \( n = 46 \)) were nulligravida and (70.1%, \( n = 54 \)) nullipara. Of the 23 women who gave birth, 30.4% \( (n = 7) \) had at least one cesarean section. Close to half (46.7% \( n = 36 \)) did not have any previous abdominal or vaginal surgery; 29.9% \( (n = 23) \) were smokers; 59.7% \( (n = 46) \) did not take any kind of hormonal treatment at the time of surgery; 13% \( (n = 10) \) were on combined oral contraceptives, 15.6% \( (n = 12) \) on the progestogen-only pill or had a levonorgestrel intrauterine device, 3.9% \( (n = 3) \) had GnRH-analogues, 1.3% \( (n = 1) \) ulipristal acetate, 1.3% \( (n = 1) \) bromocriptine, and 2.6% \( (n = 2) \) had a hormonal replacement treatment.

Endometriosis was simultaneously present in 53.2% \( (n = 41) \) of all cases. According to the American Society for Reproductive Medicine (ASRM) endometriosis classification, 46.3% \( (n = 19) \) were at stage I, 14.6% \( (n = 6) \) at stage II, 9.8% \( (n = 4) \) at stage III, and 29.3% \( (n = 12) \) at stage IV. Gynecological malignancies were associated in 28.6% \( (n = 22) \); among them, there were seven cases of endometrial cancer, one case of uterine carcinosarcoma, eight cases of borderline ovarian tumors, five cases of epithelial ovarian cancer, and one case of yolk sac tumor of the ovary (Table 1).

Reasons for surgery were in most cases pelvic pain (29.9%, \( n = 23) \), surgery for gynecologic malignancies (27.3%, \( n = 21) \), infertility (20.8%, \( n = 16) \), and suspicious pelvic mass (15.6%, \( n = 12) \). All indications are shown in Table 2. Of the 77 patients, 6.5% \( (n = 5) \) underwent colorectal surgery (one rectal segmental resection, four shaving of the rectal muscularis).

3.1.2. Phenotype

Most (64.9%, \( n = 50) \) of the cases could be adequately visualized. Five cases were excluded because laparotomy was performed without video documentation, seven cases because no video was archived, and three cases were due to poor video quality. In seven patients, endosalpingiosis could not be distinguished on the peritoneum or from other adjacent lesions (i.e., endometriosis). Endosalpingiosis was not visible due to its sole location in the lymph nodes (three cases) or omentum (two cases).
Table 1. Demographic data in the own and the systematic review population.

|                          | Own Population | Systematic Review | p-Values |
|--------------------------|----------------|-------------------|----------|
| Age (years)              | 40.2 (SD 16.4) | 45.7 (SD 14.4)    | 0.003    |
| Parity                   |                |                   | 0.232    |
| premenopausal            | 75.3% (58/77)  | 65.9% (58/88)     | <0.001   |
| postmenopausal           | 24.7% (19/77)  | 34.1% (30/88)     | <0.001   |
| Menopausal status        | 0.232          |                   |          |
| premenopausal            | 75.3% (58/77)  | 65.9% (58/88)     | <0.001   |
| postmenopausal           | 24.7% (19/77)  | 34.1% (30/88)     | <0.001   |
| Parity                   | 0              |                   |          |
| 0                        | 70.1% (54/77)  | 22% (11/50)       |          |
| I                        | 7.8% (6/77)    | 20% (10/50)       |          |
| ≥II                      | 22.1% (17/77)  | 58% (29/50)       |          |
| Endometriosis            |                |                   |          |
| rASRM                    |                |                   |          |
| I/II                     | 53.2% (41/77)  | 9% (106/1174)     | <0.001   |
| III/IV                   | 39% (16/41)    | 43.8% (7/16 *)    | <0.001   |
| Neoplasm **              |                |                   |          |
| cervical                 | 1.3% (1/77)    | 6.4% (7/110)      |          |
| uterine                  | 10.4% (8/77)   | 30.9% (34/110)    |          |
| ovarian                  | 18.2% (14/77)  | 19.1% (21/110)    |          |
| breast                   | 2.6% (2/77)    | 17.3% (19/110)    |          |
| intestinal               | 2.6% (2/77)    | 2.7% (3/110)      |          |
| other                    | 2.6% (2/77)    | 15.5% (17/110)    |          |

SD—Standard deviation. * Only 16 cases in which the rASRM stage is indicated. ** Neoplasm also includes non-invasive entities such as cervical cancer-in situ, endometrial hyperplasia, and borderline ovarian tumors. rASRM = Revised Score of the American Society for Reproductive Medicine.

Table 2. Reasons for surgery in the own and the systematic review population.

|                          | Own Population (n = 77) | Systematic Review (n = 295) | p-Values |
|--------------------------|-------------------------|----------------------------|----------|
| Pelvic pain              | 29.9% (n = 23)          | 21.4% (n = 63)             | 0.115    |
| Gynecologic neoplasm *   | 27.3% (n = 21)          | 15.6% (n = 46)             | 0.018    |
| Fertility diagnostic     | 20.8% (n = 16)          | 7.1% (n = 21)              | <0.001   |
| Suspicious pelvic mass   | 15.6% (n = 12)          | 28.9% (n = 85)             | 0.019    |
| Abnormal uterine bleeding| 3.9% (n = 3)            | 5.1% (n = 15)              | 0.665    |
| Bowel disorder           | 1.3% (n = 1)            | 1.4% (n = 4)               | 0.969    |
| Risk reduction surgery   | 1.3% (n = 1)            | 1.0% (n = 3)               | 0.831    |
| Breast cancer            | 0% (n = 0)              | 6.1% (n = 18)              | 0.026    |
| Suspicion of urinary tract neoplasm | 0% (n = 0) | 5.1% (n = 15) | 0.043    |
| Urinary tract disorder   | 0% (n = 0)              | 3.7% (n = 11)              | 0.085    |
| Inguinal mass            | 0% (n = 0)              | 2.0% (n = 6)               | 0.207    |
| Intestinal cancer        | 0% (n = 0)              | 1.0% (n = 3)               | 0.374    |
| Cesarean section         | 0% (n = 0)              | 0.7% (n = 2)               | 0.469    |
| Ectopic pregnancy        | 0% (n = 0)              | 0.3% (n = 1)               | 0.609    |
| Paravertebral cyst       | 0% (n = 0)              | 0.3% (n = 1)               | 0.609    |
| Spleenic mass            | 0% (n = 0)              | 0.3% (n = 1)               | 0.609    |

* Neoplasm also includes non-invasive entities such as cervical cancer-in situ, endometrial hyperplasia, and borderline ovarian tumors.

The mean single-lesion size was 3.6 mm (range 1–40 mm, SD 5.7 mm). The main colors were transparent (48%, n = 24) and white (22%, n = 11). Most lesions had a regular shape (64%, n = 32), were flat (70%, n = 35), had a smooth surface (84%, n = 42), and had a soft or liquid consistency (88%, n = 44). Calcifications were present in 24% (n = 12), and adhesion in 32% (n = 16). The main visual group was vesicular type (62%, n = 31), followed by fimbrial-like (12%, n = 6), cystic (10%, n = 5), and polypous (6%, n = 3) (Table 3). In three cases, there was a second lesion of endosalpingiosis. Among them, two were vesicular and one of type 5 (unusual). Figure 2 provides a schematic intraoperative view of the findings.
### Table 3. Phenotype and visual pattern distribution of endosalpingiosis lesions in the own and systematic review population.

|                        | Own Population | Systematic Review | \(p\)     |
|------------------------|----------------|-------------------|-----------|
| **Size mean (mm)**     |                |                   |           |
|                        | \(n = 50\)     | \(n = 99\)        |           |
|                        | 3.6 (range 1–40) | 48.5 (range 2–250) | < 0.001 * |
| **Shape**              |                |                   |           |
| symmetric              | 64% (n = 32)   | 36.4% (n = 36)    | \(p = 0.001\) |
| irregular              | 36% (n = 18)   | 63.6% (n = 63)    |           |
| **Color**              |                |                   |           |
| transparent            | 48% (n = 24)   | 31.3% (n = 31)    | \(p = 0.005\) |
| white                  | 22% (n = 11)   | 10.1% (n = 10)    |           |
| yellow                 | 10% (n = 5)    | 15.2% (n = 15)    |           |
| light red              | 16% (n = 8)    | 18.2% (n = 18)    |           |
| dark red/brown         | 4% (n = 2)     | 25.3% (n = 25)    |           |
| **Height**             |                |                   |           |
| flat                   | 70% (n = 35)   | 8.1% (n = 8)      | < 0.001   |
| polypous               | 22% (n = 11)   | 15.2% (n = 15)    |           |
| cystic                 | 8% (n = 4)     | 76.8% (n = 76)    |           |
| **Surface**            |                |                   |           |
| smooth                 | 84% (n = 42)   | 88.9% (n = 88)    | 0.398     |
| irregular              | 16% (n = 8)    | 11.1% (n = 11)    |           |
| **Consistency**        |                |                   |           |
| soft                   | 88% (n = 44)   | 67.7% (n = 67)    | 0.007     |
| solid                  | 12% (n = 6)    | 32.3% (n = 32)    |           |
| **Calcification**      |                |                   |           |
| no                     | 76% (n = 38)   | 87.9% (n = 78)    | 0.063     |
| yes                    | 24% (n = 12)   | 12.1% (n = 12)    |           |
| **Adhesions**          |                |                   |           |
| no                     | 68% (n = 34/50)| 91.9% (n = 91/99) | 0.002     |
| string                 | 8% (n = 4/50)  | 1% (n = 1/99)     |           |
| area                   | 14% (n = 7/50) | 3% (n = 3/99)     |           |
| dense                  | 10% (n = 5/50) | 4% (n = 4/99)     |           |
| **Endometriosis**      |                |                   |           |
| no                     | 74% (n = 37/50)| 88.9% (n = 88/99) | 0.054     |
| peritoneal             | 16% (n = 8/50) | 8.1% (n = 8/99)   |           |
| deep                   | 10% (n = 5/50) | 3% (n = 3/99)     |           |
| **Pattern type**       |                |                   |           |
| 1                      | vesicular      | 62% (n = 31/50)   | 8.1% (n = 8/99) | < 0.001 |
| 2                      | polypous       | 6% (n = 3/50)     | 11.1% (n = 11/99) |
| 3                      | fimbrial like  | 12% (n = 6/50)    | 1% (n = 1/99) |
| 4                      | cystic         | 10% (n = 5/50)    | 49.5% (n = 49/99) |
| 5                      | unusual        | 10% (n = 5/50)    | 30.3% (n = 30/99) |

* Mann–Whitney-U test. All others were the Chi-square test.

### 3.1.3. Anatomical Distribution

Adequate information on anatomic distribution was available in all 77 cases. Twenty-six percent (\(n = 20\)) were multicentric, meaning that they were found in more than one localization. Most (89.6%, \(n = 69\)) were located in the pelvis, 14.3% (\(n = 11\)) in the remaining abdominal cavity, and 3.9% (\(n = 3\)) in the lymph nodes. The most frequent localization was the sacrouterine ligaments (24.7%, \(n = 19\)), followed by the peritoneum of Douglas (20.8%, \(n = 16\)), and of the bladder (19.5%, \(n = 15\)) (Table 4).

### 3.2. Systematic Review

Two hundred and ten publications were included, with a total of 1174 patients. Among them, 77.1% (\(n = 162\)) were case reports or case series with less than five cases, and 22.9% (\(n = 48\)) of publications were original human research. Less than half (42.8%, \(n = 90\)) of the articles had information about the visual aspect of endosalpingiosis and anatomical distribution, and 20.5% (\(n = 43\)) of the studies included a picture of the macroscopic
appearance [2,15–103] (Figure 3). Most (81.4%, n = 171) included a histological picture, 8.1% (n = 17) an ultrasound image, 11.0% (n = 23) a CT-scan, and 11.4% (n = 24) an MRI image. More than half (57.1%, n = 120) of the studies included only information on the anatomical distribution and no depiction of the phenotype [1,8,104–221]. All of the studies with information on the phenotype also indicated the anatomical distribution.

Figure 2. Schematic representation of the different patterns of endosalpingiosis in the female pelvis as seen by the laparoscopist (patterns 1–5 according to Figure 1).

Table 4. Anatomical distribution of endosalpingiosis lesions in the own and systematic review population.

|                | Own Population n = 77 | Systematic Review n = 1174 | p-Values |
|----------------|------------------------|---------------------------|----------|
| Urinary tract  | 19.5% (n = 15)         | 4.1% (n = 48)             | <0.001   |
| Bladder        | 19.5% (n = 15)         | 4% (n = 47)               | <0.001   |
| Ureter         | 0% (n = 0)             | 0.1% (n = 1)              | 0.798    |
| Vagina         | 0% (n = 0)             | 0.1% (n = 1)              | 0.798    |
| Uterus         | 6.5% (n = 5)           | 6.3% (n = 74)             | 0.947    |
| Surface        | 6.5% (n = 5)           | 4.7% (n = 56)             | 0.496    |
| Deep           | 0% (n = 0)             | 1.4% (n = 17)             | 0.288    |
| Ovary          | 15.6% (n = 12)         | 23.2% (n = 272)           | <0.001   |
| Left           | 5.2% (n = 4)           | 2.6% (n = 30)             | 0.168    |
| Right          | 10.4% (n = 8)          | 2.9% (n = 34)             | <0.001   |
| NOS            | 0% (n = 0)             | 17.7% (n = 208)           | <0.001   |
3.2.1. Demographic Data—Age, Parity, Menopause, Reasons for Surgery

The mean age of the patients was 45.7 years (SD 14.4). We found information about menopausal status in a total of 88 patients. Most (65.9%, n = 58) were premenopausal. Data about parity was available for 50 patients. Twenty-two percent (n = 11) were nulliparous, 20% (n = 10) primiparous, and 58% (n = 29) had more than one child.
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Figure 3. PRISMA flow diagram of the study selection in the systematic review population.

Of the 1174 included patients, only 9.4% (n = 110) had a malignancy. Among them, 19.1% (n = 21) was ovarian neoplasm, 30.9% (n = 34) was uterine cancer, 17.3% (n = 19) was breast neoplasm, 6.4% (n = 7) was cervical neoplasm, 2.7% (n = 3) was intestinal neoplasm, and 15.5% (n = 17) was others. There were no reported vaginal or vulvar cancer in the included studies. Ovarian neoplasm included borderline tumors and ovarian cancer. Breast neoplasm included ductal carcinoma in situ and breast cancer. There was no information about the exact entity in the remaining 8.1% (n = 9) (Table 1).

Data on the indication for the surgery was available in 295 patients. These were mainly: 28.8% (n = 85) suspicious pelvic mass, 21.4% (n = 63) acute or chronic pelvic pain, 15.6% (n = 46) gynecologic neoplasm, and 7.1% (n = 21) fertility diagnostic. All indications are shown in Table 2. Of the 295 patients where indication for surgery and procedure were known, 3.7% (n = 11) received colorectal surgery (seven rectosigmoid resections, one right hemicolectomy, one ileocecal resection, one other colonic segmental resection, one small bowel segmental resection).
3.2.2. Phenotype

In 99 patients in 90 different studies, enough data were present to evaluate the macroscopic appearance. The mean size was 48.5 mm (range 2–250 mm). Most of the lesions were irregular in shape (63.6%, n = 63), transparent (31.3%, n = 31), or dark in color (25.3%, n = 25), cystic (76.8%, n = 76) with a smooth surface (88.9%, n = 88), and liquid consistency (67.7%, n = 67). The main visual group was the cystic type (49.5%, n = 49), followed by unusual (30.3%, n = 30), polypous (11.1%, n = 11), vesicular (8.1%, n = 8), and finally fimbrial-like (1%, n = 1) (Table 3). In four cases, there was a second type of phenotype. Three of them additionally had a type 4 (cystic), and one a type 5 (unusual) lesion.

3.2.3. Anatomical Distribution

In 210 publications with a total of 1174 patients, there was information about the lesion localization of the endosalpingiosis lesion. In 90.6% (n = 1064) of the cases, the lesion was localized only on one site, affecting not more than one organ (unilocular); 4.9% (n = 57) were multilocular; and 4.5% (n = 53) were diagnosed on abdominal washing cytology and could not be assigned to the above two groups. The most frequent localization was the ovaries (23.2%, n = 272), the fallopian tubes (20.4%, n = 239), and the lymph nodes (18.5%, n = 217). Table 4 shows all the different localizations of the lesion.

3.3. Comparison between Own and Systematic Review Population

When comparing the own with the literature population, there were significant differences in the macroscopic aspect between our collective and the reported cases in terms of size ($p < 0.001$), shape ($p = 0.001$), color ($p = 0.005$), height ($p < 0.001$), consistency ($p = 0.007$), adhesions ($p = 0.002$), and in the main visual groups ($p < 0.001$) (Table 3).

Furthermore, there were significant differences in the anatomical distribution. We found more lesions on the peritoneum of the bladder ($p < 0.001$), the parametrium ($p < 0.001$), the sacrouterine ligaments ($p < 0.001$), the pelvic sidewall ($p < 0.001$), the cavity of Douglas ($p < 0.001$), and the abdominal wall ($p = 0.047$). In contrast, the cases reported in the literature were more likely to be localized in the ovary ($p < 0.001$), fallopian tube ($p < 0.001$), and lymph nodes ($p < 0.001$) (Table 4). There was no significant difference in the percentage of colorectal procedures between the two populations ($p = 0.287$).

4. Discussion

This study shows the relevant differences between the own population, reflecting clinical practice at a gynecological reference center, and the systematic literature population.

In both populations, the main indications for surgery were pelvic pain, gynecological neoplasm, infertility, and pelvic mass. Significantly more frequent in the own population was fertility diagnostic and surgery for neoplasms; in the literature group, it was pelvic mass. That fertility work-up is a common indication for surgery in patients with findings of endosalpingiosis is consistent with Prentice et al. (27.6% (n = 16/58) vs. 27.1% (16/59) in premenopausal patients) [1]. That pelvic mass was more common as an indication in the literature population is most likely due to the large manifestations seen in preoperative imaging [73,81,213]. The indications seem heterogeneous, which strengthens the currently accepted thesis that endosalpingiosis is mostly an incidental finding and does not cause pain or infertility [1].

This study’s clinically most relevant finding lies in the macroscopically different lesions (Table 3). Based on nine phenotypic features described in the Materials and Methods, the lesions were subdivided into five visual patterns, which have been published elsewhere [12]: Type 1 lesions (vesicular) are mostly smaller than 5 mm, symmetric with a translucent clear or yellow liquid content; Type 2 (polypous) are around 5 mm to 10 mm in size, with a smooth surface and reddish color with the closest resemblance to endometriosis; Type 3 (fimbrial-like) looks like fimbrial mucosa with a smooth opaque surface and appears as grouped bumps, frequently on fallopian tubes; Type 4 (cystic) are usually bigger than 10 mm, forming a cystic sac and can be found as pedunculated structures attached to
pelvic organs. Type 5 includes all other lesions. The average size of a single lesion in the study population was less than 4 mm (mostly vesicular (Type 1), 62%), whereas in the literature population, it was almost 5 cm (mostly cystic (Type 4), 49.5%) (Table 3, Figure 1). This difference most likely resulted from publication bias. Most (77.1%) of the articles containing information on the intraoperative aspect of endosalpingiosis are case reports, where impressive examples are interesting [66,68]. This underlines that knowledge on the part of the laparoscopist is important to even recognize this entity intraoperatively.

To date, the origin of endosalpingiosis is not clear. Similar hypotheses of development (retrograde menstruation, metaplasia of the coelomic epithelium, iatrogenic, metastatic, embryonic remnant) are proposed as for endometriosis. Reactive excessive tubal proliferation following salpingitis is another theory [4,222]. Additionally, the natural history of endosalpingiosis and the course of changes over the lifespan are completely unclear.

The term “florid” endosalpingiosis is frequently used in the literature, representing large cystic findings. A recognized definition is missing, so it is unclear whether the term “florid” correlates with biological behavior [51,68,74,78,87,200].

How and even whether to approach endosalpingiosis lesions surgically has not been determined. We used near-contact laparoscopy with high resolution. All macroscopically detected foci were removed by local peritoneal excision. Due to the unclear significance and for histological workup with differentiation from other entities, especially endometriosis, until now, we have deliberately decided to avoid ablative procedures.

Although the distinction from endometriosis can often only be made histologically, some features can help to differentiate these entities intraoperatively. According to our experience and published hypothesis, endosalpingiosis lesions seem to have a more symmetrical, clearly circumscribed shape, sometimes surrounded by fine adhesions (32%) and calcifications (24%). Endosalpingiosis seems rarely associated with inflammation (neoangiogenesis, fibrosis). Additionally, we did not encounter any distortion of the anatomy in our cases, as is common in deep endometriosis [12].

The calcifications look like grains of sand and are associated with psammoma bodies, which are dystrophic calcification following cellular degeneration [223]. These are in ovarian serous papillary neoplasms and non-neoplastic peritoneal diseases such as endosalpingiosis [224].

Another differential diagnosis to be considered is peritoneal mesothelioma. This presents from smaller peritoneal lesions of 2 to 20 mm to larger cystic findings. On immunohistological examination, these lesions can be distinguished from endosalpingiosis [160,225,226].

Concerning localization, 90% of lesions in our own population were located in the pelvis, most commonly on the sacrouterine ligaments, bladder, or the remaining cavity of Douglas. In the literature, more lesions were on the ovaries or fallopian tubes and as incidental findings of lymphadenectomies. Hesseling et al. found the most common lesions in the cavity of Douglas, followed by the cardinal ligaments [2].

In the literature population, the prevalence of malignancy in patients with endosalpingiosis was significantly lower than in the own population, which showed similar frequencies to the epidemiologic studies by Hermens et al. and Esselen et al. [5,7,227]. It is possible that large cystic forms are less frequently associated with malignancy. It is still unclear whether endosalpingiosis is an insignificant incidental finding or represents a relevant risk factor or even a precursor lesion [154]. As recently published research has shown, there is increasing evidence that most low-grade serous tumors in the ovary are related to endosalpingiosis [228].

The limitations of this study—concerning the own population—were the retrospective monocentric design, the limited study population, and that we could not guarantee that all manifestations were seen. To detect as many lesions as possible, we adopted the concept of near-contact laparoscopy [229]. Concerning the retrospective design and limited population, it can be said that endosalpingiosis is still usually an incidental finding, so there is no preoperative inclusion in an endosalpingiosis cohort. In addition, biopsy and
optimal imaging are required for this type of study. Nevertheless, a sample size calculation was performed to have enough power for the research question. Regarding the systematic review, a relevant proportion of the literature consisted of case reports; there were hardly any similar works to compare.

This work raises questions that could be addressed in the future: Do different types of endosalpingiosis actually exist, and is this reflected at the histopathologic level? Is there a different neoplastic potential?

5. Conclusions

The endosalpingiosis lesions found in clinical practice are much less prominent than those described in the literature. These are often a few millimeters in size, vesicular in appearance, and located in the small pelvis. For further scientific and clinical understanding of endosalpingiosis including its association with malignancy and the resulting recommendations for clinical consequences in the future, detailed knowledge of endosalpingiosis among gynecologic surgeons as initial diagnosticians is essential.

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References

1. Prentice, L.; Stewart, A.; Mohiuddin, S.; Johnson, N.P. What is endosalpingiosis? Fertil. Steril. 2012, 98, 942–947. [CrossRef] [PubMed]
2. Hesseling, M.H.; De Wilde, R.L. Endosalpingiosis in laparoscopy. J. Am. Assoc. Gynecol. Laparosc. 2000, 7, 215–219. [CrossRef] [PubMed]
3. Sampson, J.A. Postsalpingectomy endometriosis (endosalpingiosis). Am. J. Obs. Gynecol. 1930, 20, 443–480. [CrossRef]
4. Batt, R.E.; Yeh, J. Müllerianosis: Four developmental (embryonic) mullerian diseases. Reprod Sci. 2013, 20, 1030–1037. [CrossRef]
5. Hermens, M.; van Altena, A.M.; Bulten, J.; Siebers, A.G.; Bekkers, R.L.M. Increased association of ovarian cancer in women with histological proven endosalpingiosis. Cancer Epidemiol. 2020, 65, 101700. [CrossRef] [PubMed]
6. Burney, R.O.; Giudice, L.C. Pathogenesis and pathophysiology of endometriosis. Fertil. Steril. 2012, 98, 511–519. [CrossRef]
7. Esselen, K.M.; Terry, K.L.; Samuel, A.; Elias, K.M.; Davis, M.; Welch, W.R.; Muto, M.G.; Ng, S.W.; Berkowitz, R.S. Endosalpingiosis: More than just an incidental finding at the time of gynecologic surgery? Cytolog. Oncol. 2016, 142, 255–260. [CrossRef]
8. Chui, M.H.; Shib, I.M. Oncogenic BRAF and KRAS mutations in endosalpingiosis. J. Pathol. 2020, 250, 148–158. [CrossRef]
9. Redwine, D.B. Age-related evolution in color appearance of endometriosis. Fertil. Steril. 1987, 48, 1062–1063. [CrossRef]
10. von Elm, E.; Altman, D.G.; Egger, M.; Pecock, S.J.; Gotzsche, P.C.; Vandenbroucke, J.P.; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. J. Clin. Epidemiol. 2008, 61, 344–349. [CrossRef]
11. Page, M.J.; McKenzie, J.E.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E.; et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ 2021, 372, n71. [CrossRef]
12. Burla, L.; Kalaitzopoulos, D.R.; Mrozek, A.; Eberhard, M.; Samartzis, N. How and where to expect endosalpingiosis intraoperatively. Fertil. Steril. 2022, 117, 461–462. [CrossRef] [PubMed]
13. Wells, G.A.; Shea, B.; O’Conell, D.; Peterson, J.; Welch, V.; Losos, M.; Tugwell, P. The Newcastle Ottawa Scale (NOS) for Assessing the Quality of Nonrandomised Studies in Meta-Analyses; Ottawa Hospital Research Institute: Ottawa, ON, Canada, 2000.
14. Moola, S.; Munn, Z.; Tufanaru, C. Systematic reviews of etiology and risk. In Joanna Briggs Institute Reviewer’s Manual for Evidence Synthesis; Aromataris, E., Munn, Z., Eds.; The Joanna Briggs Institute: Adelaide, Australia, 2017; pp. 1–5.

15. Dore, N.; Landry, M.; Cadotte, M.; Schüür, W. Cutaneous endosalpingiosis. Arch. Dermatol. 1980, 116, 909–912. [CrossRef]  
16. Bryce, R.L.; Barbatis, C.; Charnock, M. Endosalpingiosis in pregnancy. Case report. Br. J. Obstet. Gynaecol. 1982, 89, 166–168. [CrossRef] [PubMed]  
17. Dallenbach-Hellweg, G. Atypical endosalpingiosis: A case report with consideration of the differential diagnosis of glandular subperitoneal inclusions. Pathol. Res. Pract. 1987, 182, 180–182. [CrossRef] [PubMed]  
18. Bézot, M.; Vacher Lavenu, M.C.; Bigot, J.M. Imaging of endosalpingiosis. Clin. Radiol. 1999, 54, 482–485. [CrossRef]  
19. Arai, Y.; Tsuzuki, M.; Okubo, Y.; Aizawa, T.; Miki, M. A case of submucosal endosalpingiosis in the urinary bladder. Nihon Hinyokika Gakkai Zasshi. 1999, 90, 802–805.  
20. Santusianos, G.; Ventura, L.; Partenzi, A.; Spagnoli, L.G.; Kraus, F.T. Omental endosalpingiosis with endometrial-type stroma in a woman with extensive hemorrhagic pelvic endometriosis. Am. J. Clin. Pathol. 1999, 111, 248–251. [CrossRef]  
21. Rondez, R.; Kunz, J. Serous cystadenofibroma of the epiploic appendix. A tumor of the secondary müllerian system: Case report and review of the literature. Pathol. 2000, 21, 315–318. [CrossRef]  
22. Heathley, M.K.; Russell, P. Florid cystic endosalpingiosis of the uterus. J. Clin. Pathol. 2001, 54, 399–400. [CrossRef]  
23. Redondo, P.; Idoate, M.; Corella, C. Cutaneous umbilical endosalpingiosis with severe abdominal pain. J. Eur. Acad. Dermatol. Venereol. 2001, 15, 179–180. [CrossRef]  
24. McCluggage, W.G.; O’Rourke, D.; McElhenney, C.; Crooks, M. Mullerian papilloma-like proliferation arising in cystic pelvic endosalpingiosis. Hum. Pathol. 2002, 33, 944–946. [CrossRef]  
25. Edmondson, J.D.; Vogele, K.J.; Howell, J.D.; Koontz, W.W.; Koo, H.P.; Amaker, B. Endosalpingiosis of bladder. J. Urol. 2002, 167, 1401–1402. [CrossRef]  
26. Heinig, J.; Gottschalk, I.; Cirkel, U.; Datio, R. Endosalpingiosis-an underestimated cause of chronic pelvic pain or an accidental finding? A retrospective study of 16 cases. Eur. J. Obstet. Gynecol. Reprod. Biol. 2003, 105, 75–78. [CrossRef]  
27. Gerber, T.; Bontikous, S.; Smolka, G.; Vestring, T.; Schmidt, D.; Gickler, W. Cystic lymphangiomata with endosalpingiosis as a rare cause of gastrointestinal bleeding. Z. Gastroenterol. 2002, 40, 183–188. [CrossRef]  
28. Chang, Y.; Tsai, E.M.; Yang, C.H.; Kuo, C.H.; Lee, J.N. Multilobular cyst as endosalpingiosis of uterine serosa: A case report. Kaohsiung J. Med. Sci. 2003, 19, 38–41. [CrossRef]  
29. Fukunaga, M. Tumor-like cystic endosalpingiosis of the uterus with florid epithelial proliferation. A case report. AMIS 2004, 112, 45–48. [CrossRef] [PubMed]  
30. Perera, G.K.; Watson, K.M.; Salisbury, J.; Du Vivier, A.W. Two cases of cutaneous umbilical endosalpingiosis. Br. J. Dermatol. 2004, 151, 924–925. [CrossRef]  
31. Smith, C.; Sabet, L.; Izawa, J. Management of endosalpingiosis of the urinary bladder. Urology 2004, 64, 1031. [CrossRef] [PubMed]  
32. Kajo, K.; Zabor, P.; Machaleková, K.; Plank, L.; Visnovský, J. Tumor-like manifestation of endosalpingiosis in uterus: A case report. Pathol. Res. Pract. 2005, 201, 527–530. [CrossRef]  
33. Lee, S.N.; Cho, M.S.; Kim, S.C.; Han, W.S. Tumor-like multilocular cystic endosalpingiosis of the uterine serosa: Possible clinical and radiologic misinterpretation. Acta Obstet. Gynecol. Scand. 2005, 84, 98–99. [CrossRef] [PubMed]  
34. Cunnick, G.H.; Pietrzak, P.; Richardson, N.G.; Ratcliffe, N.; Donaldson, D.R. Multiple, large, benign peritoneal cysts—A case report. Int. J. Clin. Pract. Suppl. 2005, 51–52. [CrossRef]  
35. McCoubrey, A.; Houghton, O.; McCallion, K.; McCluggage, W.G. Serous adenocarcinoma of the sigmoid mesentery arising in endosalpingiosis. J. Clin. Pathol. 2005, 58, 1221–1223. [CrossRef] [PubMed]  
36. Yousef, A.H.; Ganesan, R.; Rollason, T.P. Florid cystic endosalpingiosis of the uterus. Histopathology 2006, 49, 546–548. [CrossRef]  
37. Koren, J.; Mensikova, J.; Mukensnabl, P.; Zamecnik, M. Mullerianosis of the urinary bladder: Report of a case with suggested metaplastic origin. Virchows Arch. 2006, 449, 268–271. [CrossRef] [PubMed]  
38. Tanahashi, J.; Kashima, K.; Daa, T.; Kondo, Y.; Kitano, S.; Yokoyama, S. Florid cystic endosalpingiosis of the spleen. APIS 2006, 114, 393–398. [CrossRef] [PubMed]  
39. Li, W.M.; Yang, S.F.; Lin, H.C.; Juang, H.C.; Wu, W.J.; Huang, C.H.; Wang, C.J.; Li, C.C. Mullerianosis of the uterine mesometrium: A rare cause of hydrometra. Urology 2007, 69, 1208.e9–1208.e911. [CrossRef]  
40. Liang, J.J.; Malpica, A.; Broadus, R.R. Florid cystic endosalpingiosis presenting as an obstructive colon mass mimicking malignancy: Case report and literature review. J. Gastrointest. Cancer 2007, 38, 83–86. [CrossRef]  
41. Fukunaga, M.; Mistuda, A.; Shibuya, K.; Honda, Y.; Shimada, N.; Koike, J.; Sugimoto, M. Retroperitoneal lymphangioleiomyomatosis associated with endosalpingiosis. APIS 2007, 115, 1460–1465. [CrossRef]  
42. Cil, A.P.; Atasoy, P.; Kara, S.A. Myometrial involvement of tumor-like cystic endosalpingiosis: A rare entity. Ultrasound Obstet. Gynecol. 2008, 32, 332–338. [CrossRef]  
43. Driss, M.; Zhoua, F.; Doghri, R.; Mrad, K.; Dhouib, R.; Romdhane, K.B. Cotyledonoid dissecting leiomyoma of the uterus associated with endosalpingiosis. Arch Gynecol Obstet. 2009, 280, 1063–1065. [CrossRef]  
44. Suarez-Vilela, D.; Izquierdo-Garcia, F.M.; Mendez-Alvarez, J.R.; Dominguez-Iglesias, F. Florid cystic endosalpingiosis inside a uterine subserous leiomyoma. Pathology 2009, 41, 401–403. [CrossRef]  
45. Papavramidis, T.S.; Sapolidis, K.; Michalopoulos, N.; Karayannopoulos, G.; Cheva, A.; Papavramidis, S.T. Umbilical endosalpingiosis: A case report. J. Med. Case Rep. 2010, 4, 287. [CrossRef] [PubMed]
46. Taneja, S.; Sidhu, R.; Khurana, A.; Sekhon, R.; Mehta, A.; Jena, A. MRI appearance of florid cystic endosalpingiosis of the uterus: A case report. *Korean J. Radiol.* 2010, 11, 476–479. [CrossRef]
47. Batt, R.E.; Mhawech-Fauceglia, P.; Oduseni, K.; Yeh, J. Pathogenesis of mediastinal paravertebral müllerian cysts of Hattori: Developmental endosalpingiosis-müllerianiosis. *Int. J. Gynecol. Pathol.* 2010, 29, 546–551. [CrossRef][PubMed]
48. Maniar, K.P.; Kalir, T.L.; Palese, M.A.; Unger, P.D. Endosalpingiosis of the urinary bladder: A case of probable implantative origin with characterization of benign Fallopian tube immunohistochemistry. *Int. J. Surg. Pathol.* 2010, 18, 381–383. [CrossRef]
49. Olivia Vella, J.E.; Nair, N.; Ferryman, S.R.; Athavale, R.; Latthe, P.; Hirschowitz, L. Müllерianosis of the urinary bladder. *Int. J. Surg. Pathol.* 2011, 19, 548–551. [CrossRef]
50. Patronay, B.; Semer, D.; Hong, H. Florid cystic endosalpingiosis with extensive peritoneal involvement and concurrent bilateral ovarian serous cystadenoma. *J. Obstet. Gynaecol. India* 2011, 31, 773–774. [CrossRef]
51. Rosenberg, P.; Nappi, L.; Santoro, A.; Bufo, P.; Greco, P. Pelvic mass-like florid cystic endosalpingiosis of the uterus: A case report and a review of literature. *Arch. Gynecol. Obstet.* 2011, 283, 519–523. [CrossRef]
52. Zapardiel, I.; Tobias-Gonzalez, P.; de Santiago, J. Endosalpingiosis mimicking recurrent ovarian carcinoma. *Taiwan J. Obstet. Gynecol.* 2012, 51, 660–662. [CrossRef]
53. Kudva, R.; Hegde, P. Mullerianosis of the urinary bladder. *Indian J. Urol.* 2012, 28, 206–207. [CrossRef]
54. Bermejo, R.; Gómez, A.; Galiana, N.; Campos, A.; Puente, R.; Bas, E.; Díaz-Caneja, C. Peritoneal müllerian tumor-like (endosalpingiosis-leiomyomatosis peritoneal): A hardly known entity. *Case Rep. Obstet. Gynecol.* 2012, 2012, 329416. [CrossRef]
55. Scheel, A.H.; Frasunek, J.; Meyer, W.; Ströbel, P. Cystic endosalpingiosis presenting as chronic back pain, a case report. *Diagn. Pathol.* 2013, 8, 196. [CrossRef]
56. Oida, T.; Otoshi, T.; Kobayashi, K.; Madono, K.; Momohara, C.; Imamura, R.; Takada, S.; Matsumiya, K.; Oka, K.; Tsujimoto, M. Endocervicosis/endosalpingiosis of the bladder: A case report. *Hinyokika Kiyo. Acta Urol. Jpn.* 2013, 59, 175–177.
57. Mishima, T.; Harada, J.; Kawa, G.; Okada, T. [A case of endosalpingiosis in submucosa of the urinary bladder]. *Hinyokika Kiyo.* 2013, 59, 171–174.
58. Maeda, K.; Kojima, F.; Ishida, M.; Iwai, M.; Kagotani, A.; Kawauchi, A. Müllerianosis and endosalpingiosis of the urinary bladder: Report of two cases with review of the literature. *Int. J. Clin. Exp. Pathol.* 2014, 7, 4408–4414. [PubMed]
59. Yıgı̇t, S.; Dere, Y.; Yılmalar, H.; Ett, D. Tumor-like cystic endosalpingiosis in the myometrium: A case report and a review of the literature. *Turk. J. Pathol.* 2014, 30, 145–148.
60. Singhania, N.; Janakiraman, N.; Coslett, D.; Ahmad, N. Endosalpingiosis in conjunction with ovarian serous cystadenoma mimicking metastatic ovarian malignancy. *Am. J. Case Rep.* 2014, 15, 361–363.
61. Goodman, S.; Khan, A. Florid Cystic Endosalpingiosis. *Int. J. Surg. Pathol.* 2014, 22, 336. [CrossRef]
62. Cheung, K.W.; Cheung, V.Y. Coexisting endosalpingiosis and subserous adenomyosis. *J. Minim. Invasive Gynecol.* 2015, 22, 315–316. [CrossRef]
63. Partyka, L.; Steinhoff, M.; Lourenco, A.P. Endosalpingiosis presenting as multiple pelvic masses. *J. Obstet. Gynaecol. India* 2014, 34, 279–281. [CrossRef]
64. Hemalatha, A.L.; Ashok, K.P.; Anoosha, K.; Indira, C.S. Cystic endosalpingiosis of uterine parametrium- a scarcely encountered and sparsely documented entity. *J. Clin. Diagn. Res.* 2014, 8, FD06–FD07.
65. Lui, M.W.; Ngui, S.F.; Cheung, V.Y. Mullerian cyst of the uterus misdiagnosed as ovarian cyst on pelvic sonography. *J. Clin. Ultrasound.* 2014, 42, 183–184. [CrossRef]
66. Singh, N.; Murali, S.; Zangmo, R. Florid cystic endosalpingiosis, masquerading as malignancy in a young patient: A brief review. *BMJ Case Rep.* 2014, 2014, bcr2013201645. [CrossRef]
67. Kaneda, S.; Fujii, S.; Nosaka, K.; Inoue, C.; Tanabe, Y.; Matsuki, T.; Ogawa, T. MR imaging findings of mass-forming endosalpingiosis in both ovaries: A case report. *Abdom Imaging* 2015, 40, 471–474. [CrossRef]
68. Morales-Roselló, J.; Pamplona-Bueno, L.; Montero-Balaguer, B.; Desantes-Real, D.; Perales-Marín, A. Florid Cystic Endosalpingiosis (Müllerianosis) in Pregnancy. *Case Rep. Obstet. Gynecol.* 2016, 2016, 8621570. [CrossRef]
69. Satgunaseelan, L.; Russell, P.; Phan-Thien, K.C.; Tran, K.; Sinclair, E. Perineural space infiltration by endosalpingiosis. *Pathology* 2016, 48, 76–78. [CrossRef]
70. Stanimir, M.; ChiuTu, L.C.; Wese, S.; Milulescu, A.; Nemeş, R.N.; Bratu, O.G. Müllerianosis of the urinary bladder: A rare case report and review of the literature. *Rom. J. Morphol. Embryol.* 2016, 57 (Suppl. 2), 849–852.
71. Zangmo, R.; Singh, N.; Kumar, S.; Vatsa, R. Second Look of Endosalpingiosis: A Rare Entity. *J. Obstet. Gynaecol. India* 2017, 67, 299–301. [CrossRef][PubMed]
72. Mulayim, B.; Serin, N.; Karatas, S.; Celik, B. Cystic Endosalpingiosis of Uterus and Ovary Found on Laparoscopy: Disease of Haze. *J. Minim. Invasive Gynecol.* 2017, 24, 4–5. [CrossRef][PubMed]
73. Nguyen, B.D.; McCullough, A.E. Gastrointestinal: Cystic Endosalpingiosis of the spleen: CT, MR, and US imaging. *J. Gastroenterol. Hepatol.* 2017, 32, 1911. [CrossRef]
74. Im, S.; Park, H.S.; Cho, U.; Yoo, C.; Jung, J.-H.; Yoo, J.; Choi, H.J. Florid cystic endosalpingiosis associated with a retroperitoneal leiomyoma mimicking malignancy: A case report. *Int. J. Clin. Exp. Pathol.* 2017, 10, 10112–10116. [PubMed]
75. Quirante, F.P.; Montorfano, L.M.; Serrot, F.; E Billington, M.; Da Silva, G.; Menzo, E.L.; Szomstein, S.; Rosenthal, R.J. The case of the missing appendix: A case report of appendiceal intussusception at the site of colonic müllerianosis. *Gastroenterol. Rep. (Oxf).* 2017, 5, 309–312. [CrossRef]
76. Câmara, S.; Mendinhas, G.; Madureira, R.; Martins, A.; Veríssimo, C. Vaginal Endosalpingiosis Case Report: A Rare Entity Presenting as Intramenstrual Bleeding. *Case Rep. Obstet. Gynecol.* 2017, 2017, 2424392. [CrossRef] [PubMed]

77. Hattori, Y.; Sentani, K.; Matsuoka, N.; Nakayama, H.; Hattori, T.; Kudo, Y.; Yasui, W. Intramural florid cystic endosalpingiosis of the uterus after menopause. *J. Pathol.* 2018, 69, 321–324. [CrossRef]

78. Nixon, K.E.; Kenneth Schoolmeester, J.; Bakkum-Gamze, J.N. Florid cystic endosalpingiosis with uterine preservation and successful assisted reproductive therapy. *Gynecol. Oncol. Rep.* 2018, 25, 8–10. [CrossRef]

79. Gilbert, N.; Guo, X.; Bauer, J.; Hennig, M.; Kümpers, C.; Mersberger, A.S. Intravesical endosalpingiosis: Case report and review of the literature. *Aktuelle Urol.* 2018, 49, 266–268. [PubMed]

80. Wang, C.J.; Li, Y.C.; Jung, S.M.; Liao, Y.H.; Huang, Y.T. Masslike Cystic Endosalpingiosis in the Uterine Myometrium. *J. Minim. Invasive Gynecol.* 2019, 26, 392–393. [CrossRef]

81. Yang, M.; Li, Y.; Chen, M.; Chen, J.; Kung, F.T. Uterine endosalpingiosis: Case report and review of the literature. *Taiwan J. Obstet. Gynecol.* 2019, 58, 324–327. [CrossRef]

82. Saha, A.; Saha, K.; Mukhopadhyay, J. Intramyometrial cystic endosalpingiosis-a rare entity in gynecological pathology: A case report and brief review of the literature. *Indian J. Pathol. Microbiol.* 2019, 62, 181–183. [CrossRef]

83. Niwa, K.; Sakamoto, K.; Goto, M.; Kojima, Y.; Takahashi, M.; Ishiyama, S.; Kawai, M.; Okazawa, Y.; Tomita, N.; Seki, E.; et al. A case of endosalpingiosis in the lymph nodes of the mesocolon. *Surg. Case Rep.* 2020, 6, 181. [CrossRef]

84. Horta, I.; Ar, S.A.; Özçeltik, G.; Şahin, C.; Ergenolçu, A.M.; Akercan, F. Laparoscopic view of endosalpingiosis in a woman with dermoid cyst and endometriosis. *J. Turk. Ger. Gynecol. Assoc.* 2020, 22, 343–345. [CrossRef]

85. Mahdavi, F.S.; Tavallaei, M.; Kabir-Faroughi, A.H.M.E.; Bahadorinia, M. Paratubal endosalpingiosis: A case report. *Int. J. Surg. Case Rep.* 2020, 77, 839–845. [CrossRef]

86. Maheshwari, S.; Bhat, V.; Gadabanahalli, K.; Raju, N.; Kulkarni, P. Endosalpingiosis of urinary bladder: Report on a rare entity. *BJR Case Rep.* 2020, 6, 20190129. [CrossRef] [PubMed]

87. Fernandez, H.; Dupeux, M.; Paris, M.; Sauvan, M. Florid Cystic Endosalpingiosis and Adenomyosis of the Uterus Mimicking Malignancy. *J. Minim. Invasive Gynecol.* 2021, 28, 741–742. [CrossRef]

88. Talia, K.L.; Fiorentino, L.; Scurry, J.; McCluggage, W.G. A Clinicopathologic Study and Descriptive Analysis of “Atypical Endosalpingiosis”. *Int. J. Gynecol Pathol.* 2020, 39, 254–260. [CrossRef]

89. Peixinho, C.; Machado-Neves, R.; Silva, P.T.; Bernardes, J.; Silva, A.C.; Amaro, T. Hysteroscopic Findings Related with the Endosalpingiosis. *Int. J. Surg. Case Rep.* 2021, 34, 868–873. [CrossRef] [PubMed]

90. Subbaiah, M.; Toi, P.C.; Dorairajan, G.; Stephen, S.N. Cystic Uterine Endosalpingiosis in a Patient with Carcinoma Endometrium. *J. Midlife Health* 2020, 11, 178–180. [CrossRef]

91. Mahajan, A.D.; Mahajan, S.A.; Kulkarni, P. Coexistence of malacoplakia and mullerianosis in the urinary bladder: An uncommon pathology. *Indian J. Urol.* 2020, 36, 321–323. [CrossRef] [PubMed]

92. Fakhralddin, S.S.; Mahmood, S.N.; Qader, D.K.; Ali, A.A.; Kakamad, F.H.; Salih, A.M.; Abdullah, H.O. Mullerianosis of the urinary bladder; A case report. *Indian J. Pathol. Microbiol.* 2021, 64, 325. [CrossRef]

93. Bocchialini, T.; Ziglioli, F.; Palmieri, G.; Barbieri, A.; Infranco, A.; Milandri, R.; Simonetti, E.; Ferretti, S.; Maestroni, U. Mullerianosis of colonic nodule: Utility of EUS and endoscopic resection. *Acta Biomed.* 2021, 92 (Suppl. 1), e2021148. [CrossRef]

94. Keihanian, T.; Kumar, S.R.; Ronquillo, N.; Amin, S. A rare case of endosalpingiosis masquerading as a pedunculated subepithelial dermoid cyst and endometriosis. *Indian J. Pathol. Microbiol.* 2021, 64, 868–873. [CrossRef] [PubMed]

95. D’Ovidio, V.; Maggi, D.; Bruno, G.; Fratoni, S.; Guazzaroni, M. An Extragential Colonic Salpingiosis. *J. Gastrointestin. Liver Dis.* 2021, 30, 325. [CrossRef]

96. Murihead, F.C.; Lee, H.L.; Singh, R. Ovarian endosalpingiosis mimicking hydrosalpinges. Unexpected intraoperative findings and a diagnostic rollercoaster. *J. Surg. Case Rep.* 2021, 2021, rjab264. [CrossRef] [PubMed]

97. Busuttil, G.; German, K.; DeGaetano, J.; Scerri, A.P. The menstruating bladder, an unusual cause of haematuria. *Media. Mal.* 2012, 24, 35–38. [CrossRef]

98. Sanchez-Merino, J.-M.; Guillan-Maqueira, C.; Alvarez Garcia, A.; Mendez-Diaz, C.; Sanchez Rodriguez-Losada, J.; Chantada Abal, V. Mullerianiosis vesical. *Prog. Obstet. Y Ginecol.* 2014, 57, 25–29. [CrossRef]

99. Del Carmen, S.; Rodriguez, M.; Gomez, M.A.; Cruz, M.A.; Nunez, M.A.; Sacho, M. Mullerianiosis with Intestinal Metaplasia: A Case Report. *J. Pathol. Pathol.* 2015, 31, 226–229. [CrossRef]

100. Manucha, V.; Azar, A.; Shwyayder, J.M.; Hudgens, J.L.; Lewin, J. Cystic adenomatoïd tumor of the uterus. *J. Cancer Res. Ther.* 2015, 11, 967–969. [CrossRef]

101. Almatrafi, M.H.; Alhazmi, A.M.; Almosaieed, B.N. Mullerianiosis of the urinary bladder. *Urol. Case Rep.* 2020, 33, 101333. [CrossRef] [PubMed]

102. Ernst, A.; Aguilera, E.; Dabancens, A. [Oviductal physiological alterations and endosalpingiosis (author’s transl)]. *Reproduccion* 1981, 5, 87–93. [PubMed]
206. Magill, L.; Rajan, P.; Zafar, N.; Seywright, M.; Hendry, D. Endocervicosis and endosalpingiosis of the urinary bladder: A case report. *Case Rep. Oncol.* 2018, 11, 206–211. [CrossRef]

207. Guan, H.; Rosenthal, D.L.; Erozan, Y.S. Mullerianosis of the urinary bladder: Report of a case with diagnosis suggested in urine cytology and review of literature. *Diagn Cytopathol.* 2013, 40, 191–195. [CrossRef] [PubMed]

208. Im, S.; Jung, J.H.; Choi, H.J.; Kang, C.S. Intramural florid cystic endosalpingiosis of the uterus: A case report and review of the literature. *Ann. Diagn. Pathol.* 2008, 12, 268–272. [CrossRef] [PubMed]

209. Iida, Y.; Tabata, J.; Yorozu, T.; Kitai, S.; Ueda, K.; Saito, M.; Yanaihara, N.; Yamada, K.; Okamoto, A. Polypoid endometriosis of the cervix mimicking an ovarian carcinoma with lymph node metastasis. *Int. J. Gynecol. Pathol.* 2007, 26, 274–275. [CrossRef] [PubMed]

210. Krentel, H.; Hucke, J. Disseminated Hormone-Producing Leiomyomatosis after Laparoscopic Supracervical Hysterectomy: A Case Report. *Prog. Obstet. Y Ginecol.* 2017, 15, e54–e55. [CrossRef] [PubMed]

211. Martin, L.S.; Trusso, W.N.; Puigoriol, E.B.; Weakner, S.M.; Coss, N.E. Appendicular endosalpingiosis. *Prog. Obstet. Y Ginecol.* 2018, 61, 176–178. [CrossRef] [PubMed]
212. Ilitsky, S.; Abu Rafea, B.; Vilos, A.G.; Vilos, G.A. Pelvic Peritoneal Pockets: Distribution, Histopathology, and Clinical Significance. J. Obstet. Gynaecol. Can. 2019, 41, 1251. [CrossRef] [PubMed]

213. Tudor, J.; Williams, T.R.; Myers, D.T.; Umar, B. Appendiceal endosalpingiosis: Clinical presentation and imaging appearance of a rare condition of the appendix. Abdom. Radiol. 2019, 44, 3246–3251. [CrossRef] [PubMed]

214. Reyna-Villasmil, E.; Torres-Cepeda, D.; Rondon-Tapia, M. Müllerianosis of cervix. Case report. Rev. Peru. Ginecol. Y Obstet. 2020, 66, 4.

215. Sajnani, J.; Swan, K. Endosalpingiosis: Clinical Presentation and Coexisting Pathology. Obstet. Gynecol. 2020, 135, 83s. [CrossRef]

216. Fujii, S.; Inoue, C.; Mukuda, N.; Murakami, A.; Yamaji, D.; Yunaga, H.; Nosaka, K. Magnetic resonance imaging findings of endosalpingiosis: A case report. Acta Radiol Open. 2021, 10, 20584601211022504. [CrossRef]

217. White, M.J.; Vang, R.; Argani, P.; Cimino-Mathews, A. Endosalpingiosis Is Negative for GATA3. Arch. Pathol. Lab. Med. 2021, 145, 1448–1452. [CrossRef]

218. Santoro, A.; Angelico, G.; Inzani, F.; Spadola, S.; Arciuolo, D.; Valente, M.; Fiorentino, V.; Mulè, A.; Scambia, G.; Zannoni, G.F. The Many Faces of Endometriosis-Related Neoplasms in the Same Patient: A Brief Report. Gynecol. Obstet. Invest. 2020, 85, 371–376. [CrossRef]

219. Kurt, S.; Kandemir, S.; Yavuz, O.; Koyuncuoglu, M.; Ulukus, E.C.; Celiloglu, M. Persistent tubal epithelium in ovaries after salpingectomy. Researchsquare 2021, 3, 2339–2344. [CrossRef]

220. Wang, J.H.; Song, S.H.; Shin, B.K.; Lee, J.K.; Lee, N.W.; Lee, K.W. Primary clear cell carcinoma of a paratubal cyst: A case report with literature review. Aust. N Z J. Obstet. Gynaecol. 2011, 51, 284–285. [CrossRef]

221. O’Connor, D.; Byrne, K.G.; Walsh, K.; O’Sullivan, G.; McHale, T. Renal endometriosis mimicking a malignancy—a rare case of Reno-Mullerian fusion. Researchsquare 2021, 3, 2339–2344. [CrossRef]

222. Ong, N.C.S.; Maher, P.J.; Pyman, J.M.; Readman, E., Gordon, S. Endosalpingiosis, an unrecognized condition: Report and literature review. Gynecol. Surg. 2009, 4, 11–14. [CrossRef]

223. Ferenczy, A.; Talens, M.; Zoghby, M.; Hussain, S.S. Ultrastructural studies on the morphogenesis of psammoma bodies in ovarian serous neoplasia. Cancer 1977, 39, 2451–2459. [CrossRef] [PubMed]

224. Sun, T.; Pitman, M.B.; Torous, V.F. Determining the significance of psammoma bodies in pelvic washings: A 10-year retrospective review. Cancer Cytopathol. 2022, 129, 83–89. [CrossRef] [PubMed]

225. Cheung, K.W.; Cheung, V.Y. Response: Cystic Endosalpingiosis or Multicystic Mesothelioma? J. Minim. Invasive Gynecol. 2016, 23, 287. [CrossRef] [PubMed]

226. Silva, E.G.; Lawson, B.C.; Ramalingam, P.; Liu, J.; Shehabeldin, A.; Marques-Piubelli, M.L.; Malpica, A. Precursors in the ovarian stroma: Another pathway to explain the origin of ovarian serous neoplasms. Hum. Pathol. 2022, 127, 136–145. [CrossRef]

227. Redwine, D.B. ‘Invisible’ microscopic endometriosis: A review. Gynecol. Obstet. Invest. 2003, 55, 63–67. [CrossRef]