Original article

ALCM
ANNALS OF LABORATORY AND CLINICAL MEDICINE (ALCM)
ISSN: 3093-0219

Histopathological Analysis of Cancers of the Uterine Corpus at the University of Maiduguri Teaching Hospital, North-East Nigeria

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Abstract

Background: Malignancies of the uterus are a significant cause of morbidity and mortality affecting the female population globally. Endometrial carcinoma is the most common and most extensively studied malignancy of the uterine corpus. The aim of this study was to determine the frequency distribution and histopathological characteristics of malignancies of the uterine corpus in a tertiary hospital in Maiduguri, North-Eastern Nigeria.

Methods: This study included all histopathologically diagnosed cases of malignancies of the uterine corpus over a period of 10 years (2015 to 2024) in the Department of Histopathology and Cancer Registry, University of Maiduguri Teaching Hospital. Information was extracted from the histology request forms and records of the Cancer Registry. The malignancies were categorized according to the most recent edition of the WHO classification of uterine corpus tumours. The data were analysed using descriptive statistics, and the results were displayed in tables and charts.

Results: There were fifty-two (52) histopathologically diagnosed primary cancers of the uterine corpus during the period of study, constituting 9.8% of gynaecological malignancies, 3.2% of female cancers, and 1.9% of total cancers. Patients were aged between 30 and 85 years. The modal age group was 51–60 years and the mean age was 53.5 years. Endometrial carcinoma was the most common malignancy and accounted for 71.2% of the uterine corpus cancers, with a predominance of grade II endometrioid (type I) carcinoma. Other types of uterine malignancy evaluated included endometrial stromal sarcoma (19.2%), carcinosarcoma (7.7%), and leiomyosarcoma (1.9%).

Conclusions: Endometrial carcinoma was the most common malignancy of the uterine corpus, although a significant number of other cancers constituted 28.8% of the malignancies and affected more of the younger reproductive-age women.

Keywords: Uterine cancer; histopathological types; Maiduguri; Nigeria.

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Citation

Kabir A, Adamu AI, Usman M, Abe AM, Chiroma EM, Kyari AB. Histopathological Analysis of Cancers of the Uterine Corpus at the University of Maiduguri Teaching Hospital, North-East Nigeria *Annals of Laboratory and Clinical Medicine.* Vol 1, No 2, Dec 2025. p13-18. https://doi.org/10.82216/alcm.vol1no2.34

Introduction

Uterine cancer is the second most common gynaecological malignancy affecting women worldwide, with marked geographical disparities.[1] Cancer of the uterine corpus, sometimes referred to as endometrial cancer, is the fifth leading cancer among women globally, with an estimated 420,368 new cases and 97,723 deaths.[2,3] It is the most common gynaecological malignancy in developed countries like North America, Europe, and Australia, and the second most common cancer of the female genital tract in some developing countries.[2–5] However, in sub-Saharan Africa, and especially in Nigeria, endometrial cancer is the third most common female genital tract malignancy after cervical and ovarian cancers.[4,6–11] The International Agency for Research on Cancer (IARC) has estimated a two-fold increase in both endometrial cancer incidence and mortality over the next two decades in Africa.[12] Several histopathological types of malignancy occur in the corpus uteri and include endometrial carcinomas, endometrial stromal sarcomas, carcinosarcoma, leiomyosarcoma, and others.[4,13] The most common clinical manifestation of uterine cancer is abnormal uterine bleeding, such as postmenopausal bleeding, menorrhagia, and intermenstrual bleeding.[14] Other clinical features include abnormal vaginal discharge, dysmenorrhoea, dyspareunia, pelvic pain, and pelvic mass.[4,14–16]

Uterine cancers are staged I to IV depending on the extent of disease. Treatments offered include surgery alone, or a combination of surgery with radiotherapy, chemotherapy, or hormonal therapy, depending on the stage and hormone sensitivity of the tumour.[14–18]

Endometrial carcinoma arises from the innermost layer of the uterine cavity. It is a disease of postmenopausal women in the 6th and 7th decades of life, with a mean age of 60 years in developed countries, compared to a lower figure of 56 years reported in developing countries such as Ghana and Nigeria.[4,15,16,18] The widely accepted classification of endometrial carcinoma categorises the disease into two major pathogenetic types—type I and type II—based on epidemiological, clinical, and molecular characteristics, although a more recent molecular classification has been proposed.[3,4,15,16,19] Type I endometrial carcinoma is the most common type, accounting for 70–80% of cases; it is an oestrogen-dependent tumour, often related to endometrial hyperplasia, and is therefore due to risk factors associated with chronic unopposed oestrogen stimulation of the endometrium.[3,4,20] Type I endometrial carcinoma is also called endometrioid carcinoma because, histopathologically, it resembles proliferative endometrium.[19–22] It is also grouped into three grades—grade I (well-differentiated), grade II (moderately differentiated), and grade III (poorly differentiated)—based on the percentage of glandular component relative to solid areas.[23] Type II endometrial carcinomas, constituting 20–30%, are non-oestrogen-dependent tumours seen in older women with background endometrial atrophy. They are referred to as non-endometrioid carcinomas and, histopathologically, include serous papillary adenocarcinoma, clear cell adenocarcinoma, mucinous adenocarcinoma, and others.[3,4,14,16,20–24] Type II endometrial carcinomas are high-grade and collectively regarded as grade III tumours.[4,20–24] Both the tumour grade and histopathological type are important prognostic factors for endometrial carcinoma, in addition to the stage of the tumour and the age of the patient.[3,4,21,23,25]

Endometrial stromal sarcoma is a rare malignancy of the uterine corpus arising from the connective tissue stromal cells of the endometrium and invading the myometrium.[26–29] It accounts for 0.2% of uterine malignancies and 15–20% of uterine sarcomas.[26,28,29] It can occur at any age, but is mostly seen in women aged 40–58 years.[23,26,28] Endometrial stromal sarcoma is categorised into two groups—low-grade endometrial stromal sarcoma and high-grade endometrial stromal sarcoma or undifferentiated sarcoma.[23,26–29] Although high-grade endometrial stromal sarcoma occurs in older postmenopausal women, the major distinction is based on the aggressiveness of the tumour, characterised by marked cytological atypia, high mitotic activity with atypical mitotic figures, and tumour necrosis.[23,26–29]

Carcinosarcoma, or malignant mixed Müllerian tumour (MMMT), is also a rare tumour classified by the WHO as a mixed epithelial and mesenchymal tumour.[23] It constitutes 2–5% of uterine malignancies.[23,30,31] It is usually seen in postmenopausal women, with a mean age in the seventh decade of life.[23,32] It often presents with abnormal vaginal bleeding and a polypoid mass protruding through the cervical os.[23,30–33] It also shares several risk factors with endometrial carcinoma.[23,30] Histopathologically, it is characterized by an admixture of malignant epithelial and mesenchymal components.[23,30–33] The epithelial component shows malignant glands or other carcinomatous elements, while the mesenchymal component may have homologous or heterologous elements. The homologous stromal component consists of mesenchymal tissues normally found in the uterus and is composed of high-grade pleomorphic spindle-shaped cells, whereas the heterologous elements may include rhabdomyosarcoma and chondrosarcoma, or even osteosarcoma.[23,30–33]

Leiomyosarcoma of the uterine corpus is a malignant mesenchymal neoplasm that develops in the smooth muscle cells of the myometrium.[23,34,35] Although it is a rare malignancy of the uterus, accounting for only 1–2% of all uterine cancers, it is the most common sarcoma of the uterus.[23,34] It is an aggressive tumour with invasive and metastatic potential that frequently arises de novo, not from pre-existing leiomyoma (fibroids).[23,34–37] It usually affects women between the 4th and 7th decades of life, with a median age of 50 years, and presents with abnormal vaginal bleeding, palpable pelvic mass, and pelvic pain, as well as occasional features of extra-uterine extension and metastases.[23,35,36] Histopathologically, it is distinguished from leiomyoma by the presence of a combination of tumour necrosis, marked cytological atypia, and increased mitotic activity.[23,34,37]

Several studies have been carried out on malignancies of the female genital tract, cervical cancer, and ovarian cancer in Maiduguri and other North-Eastern states.[9,10,11,38] However, there is a paucity of studies evaluating the detailed histopathological features of cancers of the uterine corpus. Therefore, this study was conducted to determine the frequency and histopathological characteristics of malignancies of the uterine corpus at the University of Maiduguri Teaching Hospital, North-East Nigeria.

Materials and Methods

This retrospective descriptive study included all histopathologically confirmed cases of uterine corpus malignancies diagnosed between 1 January 2015 and

31 December 2024 at the Department of Histopathology and Cancer Registry, University of Maiduguri Teaching Hospital. Relevant clinicopathological information was retrieved from histology request forms and cancer registry records. The cases were reviewed, and the tumours were classified according to the 5th edition of the WHO Classification of Tumours of Female Reproductive Organs. The data were analysed using descriptive statistics and presented in tables and charts. Ethical approval for the study was obtained from the Research and Ethics Committee of the hospital. This study was limited by the inability to perform immunohistochemistry and molecular studies on the tissue samples owing to their non-availability at our centre.

Results

A total of 2,809 cancer cases were histopathologically diagnosed at the study centre. The total number of female cancers was 1,621 (57.7% of total cancers), and that of the female genital tract was 530 (18.9% of total cancers). There were 52 cases of cancer of the uterine corpus, which constituted 9.8% of gynaecological malignancies, 3.2% of female cancers, and 1.9% of total cancers. Patients were aged between 30 and 85 years. The mean age was 53.5 years and the modal age group was 51–60 years, as shown in Table 1.

The three major histopathological types of uterine corpus cancer—epithelial tumours, mesenchymal tumours, and mixed epithelial and mesenchymal tumours—all had their representative malignancies during the period of study. As shown in Table 2, there were 37 cases of endometrial carcinomas (71.2%), 10 cases of endometrial stromal sarcomas (19.2%), 4 cases of carcinosarcomas or malignant mixed Müllerian tumours (MMMT; 7.7%), and 1 case of leiomyosarcoma (1.9%).

Among the endometrial carcinomas, endometrioid (type I) carcinoma constituted 86.5% (32/37) of the cases, whereas the remaining 13.5% were type II carcinomas and included clear cell carcinoma (8.1%; 3/37), serous carcinoma (2.7%; 1/37), and small cell neuroendocrine carcinoma (2.7%; 1/37). The mean age for endometrioid carcinoma was 54.0 years, while that for non-endometrioid carcinoma was 63.6 years. The endometrioid carcinoma cases were also graded. Endometrioid carcinoma grade 1 accounted for 31.3% (10/32) of cases, while grade 2 and grade 3 endometrioid carcinomas constituted 53.1% (17/32) and 15.6% (5/32) of cases, respectively, as depicted in Figure 1. Thirteen cases (25.0% of total) and 9 cases

Table 1. Age distribution of patients with cancer of the uterine corpus.

Age group (years)	Number of cases	Percentage (%)
21 – 30	2	3.8
31 – 40	10	19.2
41 – 50	10	19.2
51 – 60	16	30.8
61 – 70	12	23.1
71 – 80	0	0.0
81 – 90	2	3.8
Total	**52**	**100**

Figure 1. Grades of endometrioid carcinoma.

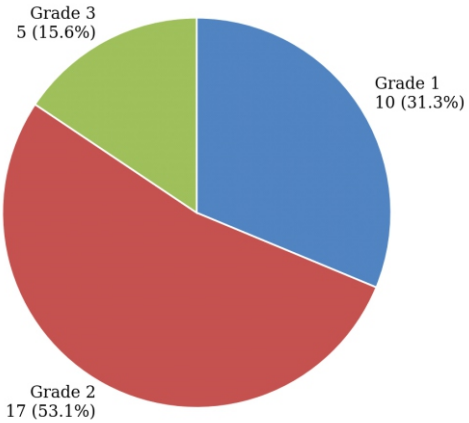

Table 2. Frequency distribution of histopathological types of cancer of the uterine corpus.

Uterine cancer	Number of cases	Percentage (%)
Epithelial tumours	**37**	**71.2**
Endometrioid carcinoma	32	61.6
Clear cell carcinoma	3	5.8
Serous carcinoma	1	1.9
Small cell neuroendocrine carcinoma	1	1.9
Mesenchymal tumours	**11**	**21.2**
Endometrial stromal sarcoma	10	19.2
Leiomyosarcoma	1	1.9
Mixed epithelial and mesenchymal tumours	**4**	**7.7**
Carcinosarcoma	4	7.7
Total	**52**	**100**

(17.3% of total) among the 22 hysterectomy specimens received showed deep (> 50%) and superficial (< 50%) myometrial invasion, respectively. The remaining 30 specimens (57.7% of total) were endometrial biopsies. Among the 13 cases (25.0% of total) with deep myometrial invasion, 5 cases (9.6% of total) also showed lymphovascular invasion, whereas none of the 9 cases (17.3% of total) with superficial myometrial invasion had lymphovascular invasion. There was no case with parametrial tumour involvement. There was also no accompanying lymph node for histopathological assessment.

The 10 cases of endometrial stromal sarcoma, which represented 19.2% of the uterine corpus malignancies, included 7 cases (13.5% of total) of low-grade and 3 cases (5.7% of total) of high-grade endometrial stromal sarcoma. Their mean age was 45.9 years. All 4 cases (7.7% of total) of carcinosarcoma had homologous mesenchymal elements and were composed of fascicles of pleomorphic spindle-shaped cells, while the epithelial component comprised well-differentiated adenocarcinoma. Their mean age was 56.3 years. The only case of leiomyosarcoma recorded during the study period was from a 68-year-old woman; it was histopathologically characterized by marked pleomorphism, the presence of 2 to 3 mitotic figures per high-power field, and areas of tumour necrosis.

Discussion

A total of 52 cases of cancer of the uterine corpus were analysed, which constituted 9.8% of the gynaecological malignancies. Kyari et al.[38] in Maiduguri and Okunowo et al.[39] in Lagos, Nigeria, previously reported that uterine tumours accounted for 8.5% and 16% of gynaecological malignancies, respectively. This study showed a rise in the incidence of endometrial cancer over the previous study by Kyari et al. in the same hospital. This increase can partly be due to the rising incidence of endometrial cancer, in keeping with the global upward trend.

The majority of uterine cancer cases in this study occurred in women aged 50 years and above (57.7%), with a modal age group of 51–60 years. Pervez et al.[40] reported a similar modal age group. Alabi et al.[41] reported a modal age of 60–69 years. The mean age in our study was 53.5 years. A similar mean age was seen in studies from Zaria (54 years) [4] and Lagos (56 years).[39] A mean age above 60 years was reported in other centres.[18] Uterine cancers are mostly seen in women in the peri- or postmenopausal period, buttressing the fact that advancing age is an important risk factor for the development of uterine cancers.[18] Advancing age is associated with an increased probability of exposure to carcinogens and accumulation of somatic mutations.[42]

Histopathologically, the most prevalent class of uterine cancer in this study was endometrial adenocarcinoma, accounting for 71.2% of the cases. Similar findings were reported by Oriji et al.[18], where adenocarcinomas constituted 70.6%. Endometrioid (type I) adenocarcinoma is known to be the most common histological type of endometrial carcinoma, which in this study constituted 86.5% of the cases. Studies in Bayelsa, Maiduguri, and Lagos documented endometrioid carcinoma of 60.5%, 70.6%, and 68%, respectively.[18,38,41] Although the findings in our study show slightly higher figures for endometrioid carcinoma than the studies above, a lower prevalence of endometrioid endometrial cancer and a higher prevalence of non-endometrioid endometrial cancers are usually observed among black women.[42]

Among the type II endometrial carcinomas, clear cell and serous papillary carcinomas are usually the most common.[3,4,14,16,20–24] This is consistent with the findings in our study.

The endometrial stromal sarcoma, with a mean age of 45.9 years, was the most common sarcoma during this study, representing 19.2% of the uterine corpus malignancies. This finding is at variance with studies that indicate that MMMTs are the most common uterine sarcomas.[43] This variation could be a local phenomenon due to the low number of cases of MMMT compared to those of endometrial stromal sarcoma found in this study. Endometrial stromal sarcoma occurs in the perimenopausal age group with an average age of 45 years.[43] This age is corroborated by the mean age of our patients. This tumour therefore occurs in younger patients than those with MMMT.[43] In the USA, MMMTs represent < 5% of all uterine malignancies and occur in postmenopausal women.[1,2,23] Efared et al.[30] found a higher prevalence of carcinosarcomas in their study, representing 12.67% of all uterine malignancies, with a mean age of 58.8 years, similar to our study. All 4 cases of carcinosarcoma reported in our study had homologous mesenchymal elements. Seleye-Fubara et al.[43] reported both homologous and heterologous mesenchymal elements of MMMT in Port Harcourt, Nigeria.

The only case (1.9%) of leiomyosarcoma recorded in this study was from a 68-year-old woman. Leiomyosarcoma is the most common subtype of uterine sarcoma, occurring in 1–2% of uterine cancer cases. It has a predilection for perimenopausal women aged > 50 years.[34] While it is known to be the most common uterine sarcoma, this is at variance with our report, where it is the least common malignancy, owing to the relatively high number of endometrial stromal sarcomas. However, the finding that it accounted for 1.9% of the uterine cancers in our study is consistent with the reported global incidence of 1–2% of uterine corpus malignancies.[2,23,34–37]

Limitations of the Study

This is a retrospective study from a tertiary health institution. There was limited clinical follow-up data. There was also a limitation posed by the inability to perform immunohistochemistry and molecular studies on the tissue samples owing to their non-availability at our centre.

Conclusion

This study demonstrated that endometrial carcinoma is the predominant uterine corpus malignancy in North-Eastern Nigeria, with endometrioid carcinoma being the most frequent histological subtype. A notable proportion of mesenchymal malignancies was also observed among younger women. The findings provide important baseline data on the histopathological patterns of uterine corpus cancers in the region and highlight the need for improved diagnostic and cancer surveillance services.

Acknowledgements

We wish to acknowledge Professors U. H. Pindiga and H. A. Nggada for diagnosing some of the malignancies. We equally acknowledge the assistance of the entire staff of the Department of Histopathology and Cancer Registry of the University of Maiduguri Teaching Hospital, Maiduguri, Borno State, Nigeria.

Conflict of Interest: None.

References

1. Qiu S, Jiang S, Ye Q, Yang Y, Li X. Global trends and geographical disparities in the incidence of uterine cancer from 1990 to 2021. *Eur J Obstet Gynecol Reprod Biol.* 2025;311:114066.
2. Ferlay J, Ervik M, Lam F, Laversanne M, Colombet M, Mery L, et al. Global Cancer Observatory: Corpus Uterine Cancer Today. Lyon: IARC Press; 2024. Available from: https://gco.iarc.who.int/today (accessed 15 October 2025).
3. Jezan HS, Kutb MA. Histopathological variations of endometrial carcinoma. *IJSHR.* 2019;4(4):207–11.
4. Olatunde OA, Samaila MO, Imam MI, Uchime KE, Dauda SE. Histopathological patterns of endometrial carcinoma in a tertiary hospital in North-West Nigeria. *ecancer.* 2024;18:1651.
5. Mohammed A, Ahmed SA, Oluwole OP, Avidime S. Malignant tumours of the female genital tract in Zaria, Nigeria: analysis of 513 cases. *Ann Afr Med.* 2006;5(2):93–6.
6. Zhu B, Gu H, Mao Z, Beeraka NM, Zhao X, Anand MP, et al. Global burden of gynecological cancers in 2022 and projections to 2050. *J Glob Health.* 2024;14:04155.
7. Iyoke CA, Ugwu GO. Burden of gynaecological cancers in developing countries. *World J Obstet Gynecol.* 2013;2(1):1–7.
8. Yakasai IA, Ugwa EA, Otubu J. Gynecological malignancies in Aminu Kano Teaching Hospital, Kano: a 3-year review. *Niger J Clin Pract.* 2013;16(1):63–6.
9. Katagum DA, Ezenkwa US, Achanya SE, Lawan AI, Suleiman DE, Kadaura MU, et al. Spectrum of gynecologic malignancies in Northeastern Nigeria. *Front Oncol.* 2025;15:1420113.
10. Usman HA, Audu BM, Bukar M, Mayun A, Sanusi IM. A five-year review of female genital tract malignancies at the University of Maiduguri Teaching Hospital, Maiduguri, Nigeria. *Bo Med J.* 2017;14(2):152–8.
11. Usman HA, Audu BM, Sanusi IM, Bukar M, Pindiga UH. Pattern of cancers at a rural referral centre in North-Eastern Nigeria. *Bo Med J.* 2018;15(1):21–8.
12. Anakwenze CP, Ewongwo A, Onyewadume L, Oyekan A, Chigbo CO, Valle L, et al. A systematic review of endometrial cancer clinical research in Africa. *Infect Agent Cancer.* 2024;19:2.
13. Usman A, Bello SS, Abdulrahman A, Rasheed FA, Adam S, Dahiru A. A histopathological review of gynaecological malignancies in Katsina State, Northwestern Nigeria. *ecancer.* 2024;18:1750.
14. Masih V, Ashima, Singla R, Isaacs R. Histopathology of endometrial carcinoma presenting with abnormal uterine bleeding. *Int J Acad Med Pharm.* 2024;6(3):150–2.
15. Gouthaman S, Saravanan R, Maharajan S, Pitani RS, Soundarajan JCB. Clinicopathological analysis of carcinoma endometrium at a tertiary care centre in Chennai—a retrospective study. *J Evid Based Med Healthc.* 2021;8(29):2625–32.
16. Zaim SNM, Nafi SNM, Zawawi N, Adnan WFW. Clinical and histopathological evaluation of patients with endometrial cancer in a university hospital: seven-year experience. *Malays J Pathol.* 2024;46(3):413–21.
17. Burke WM, Orr J, Leitao M, Salome E, Gehrig P, Olawaiye AB, et al. Endometrial cancer: a review and current management strategies: Part I. *Gynecol Oncol.* 2014;134(1):385–92.
18. Oriji PC, Allagoa DO, Obagah L, Ohaeri OS, Tekenah ES, Afolabi AS, et al. Endometrial cancer in a tertiary hospital in South-South Nigeria: a 5-year review. *IRJO.* 2021;4(1):108–16.
19. Anca-Stanciu M, Manu A, Olinca MV, Coroleucă C, Comandas D, Coroleuca CA, et al. Comprehensive review of endometrial cancer: new molecular and FIGO classification and recent treatment changes. *J Clin Med.* 2025;14:1385.
20. Seresht LM, Asadi A, Behnamfar F. Histopathological features of endometrial cancer: a cross-sectional study. *Am J Clin Exp Obstet Gynecol.* 2024;10(1):1–10.
21. Nipanal HV, Susmitha S. Critical analysis of carcinoma endometrium histopathology. *Sch Int J*

Obstet Gynec. 2019;2(2):45–8.
22. Chandwani TV, Bhat DM, Deshpande AH. Histological spectrum and diagnostic challenges in endometrial carcinoma of the uterus. *Int J Reprod Contracept Obstet Gynecol.* 2023;12(6):1830–7.
23. Zaino R, Carinelli SG, Ellenson LH, Eng C, Katabuchi H, Konishi I, et al. Tumours of the uterine corpus. In: Kurman RJ, Carcangiu ML, Herrington CS, Young RH, editors. WHO Classification of Tumours of Female Reproductive Organs. 5th ed. Lyon: IARC Press; 2020. p. 122–54.
24. Mendivil A, Schuler KM, Gehrig PA. Non-endometrioid adenocarcinoma of the uterine corpus: a review of selected histological subtypes. *Cancer Control.* 2009;16(1):46–52.
25. Bak SE, Yoo JG, Lee SJ, Yoon JH, Park DC, Kim S. Prognostic significance of histological grade in low-risk endometrial cancer. *Int J Med Sci.* 2022;19(13):1875–8.
26. Ricotta G, Russo SA, Fagotti A, Martinez A, Gauroy E, Del M, et al. Endometrial stromal sarcoma: an update. *Cancers.* 2025;17(11):1893.
27. Capozzi VA, Monfardini L, Ceni V, Cianciolo A, Butera D, Gaiano M, et al. Endometrial stromal sarcoma: a review of a rare mesenchymal uterine neoplasm. *J Obstet Gynaecol Res.* 2020;46(11):2221–36.
28. Ohayi SAR, Arinze-Onyia S, Okafor II. Endometrial stromal sarcoma: case report and review of literature. *J Exp Res.* 2014;2(1):51–6.
29. Ashraf-Ganjoei T, Behtash N, Shariat M, Mosavi A. Low-grade endometrial stromal sarcoma of uterine corpus: a clinico-pathological and survey study in 14 cases. *World J Surg Oncol.* 2006;4:50.
30. Efared B, Koura HH, Bako ABA, Boubacar I, Boureima HS, Mahamadou G, et al. Uterine carcinosarcomas: a case series of 9 cases from a low-income country. *Medicine.* 2024;103:40.
31. Toro-Wills MF, Álvarez-Londoño A, Hernández-Blanquisett A, Marquez FS, Martínez-Ávila MC. Endometrial carcinosarcoma: a poor-prognosis debut with favourable therapeutic outcome. *ecancer.* 2022;16:1472.
32. Adachi Y, Nonogaki H, Minamiguchi S, Li M, Ikehara S. Carcinosarcoma of the uterus: a case report. *Mol Clin Oncol.* 2016;4(1):571–3.
33. Terblanche L, Botha MH. Uterine carcinosarcoma: a 10-year single institution experience. *PLoS One.* 2022;17(7):e0271526.
34. Gockley AA, Rauh-Hain JA, del Carmen MG. Uterine leiomyosarcoma: a review article. *Int J Gynecol Cancer.* 2014;24(1):1538–42.
35. Dunphy L, Sheridan G. Uterine leiomyosarcoma: a rare clinical entity. *BMJ Case Rep.* 2021;14:e244233.
36. Anozie OB, Nwafor JI, Esike CU, Ukaegbe CI, Ewah RL, Onwe EO, et al. Metastatic uterine leiomyosarcoma in a nullipara with primary infertility: a case report. *IJIRMS.* 2019;4(11):610–14.
37. Yang Q, Madueke-Laveaux OS, Cun H, Wlodarczyk M, Garcia N, Carvalho KC, et al. Comprehensive review of uterine leiomyosarcoma: pathogenesis, diagnosis, prognosis, and targeted therapy. *Cells.* 2024;13:1106.
38. Kyari O, Nggada HA, Mairiga A. Malignant tumours of female genital tract in North-Eastern Nigeria. *East Afr Med J.* 2004;81(3):142–5.
39. Okunowo AA, Alakaloko MA, Ohazurike EO, Okunade KS, Anorlu RI. Trends and characteristics of endometrial cancer in Lagos, Nigeria. *GJO.* 2019;31(1):51–9.
40. Pervez SN, Khaliq S, Ali H, Ali Shah SA. Histopathological analysis of endometrial lesions and its correlation with age in Khyber Pakhtunkhwa region of Pakistan. *Rawal Med J.* 2023;48(1):164–7.
41. Alabi B, Sowumi A, Folorunsho S, Alabi A, Adegboyega B, Popoola A. Epidemiology and clinicopathological patterns of endometrial carcinoma in a Lagos tertiary hospital, South-West Nigeria. *Kanem J Med Sci.* 2021;15(2):92–9.
42. Valu MV, Toma O. Endometrial cancer: a review and evaluation of risk factors. *IJMARC.* 2017;18(3):129–36.
43. Seleye-Fubara D, Uzoigwe SA. Uterine sarcomas in Port Harcourt, Nigeria: a 12-year clinico-pathologic study. *Afr Health Sci.* 2007;7(1):10–13.