



OPEN ACCESS

For numbered affiliations see end of article.

Correspondence to

Dr Felix KF Kommos, Institute of Pathology, University Hospital Heidelberg, 69120 Heidelberg, Germany; felix.kommos@med.uni-heidelberg.de

Accepted 15 January 2021
Published Online First
27 January 2021

Three-dimensional virtual histology of benign and malignant endometrial stromal neoplasms: a new perspective on why morphology matters

Felix KF Kommos,¹ Jonas Albers,² Constantin Schwab,¹ Willi L Wagner,^{3,4} Giuliana Tromba,⁵ Christian Dullin^{2,3,4}

A perimenopausal woman presented with a history of hypermenorrhea and enlargement of uterine fibroids. Histopathological examination of curettage material showed fragments of a mesenchymal neoplasm consisting of small and monomorphic spindle cells with scant cytoplasm, reminiscent of non-neoplastic proliferative phase endometrial stroma. The patient underwent hysterectomy to rule out malignancy. Gross examination revealed an intramural mass located within the uterine corpus. Histologically, characteristic finger-like projections of neoplastic stromal cells, infiltrating the myometrium, were seen. Based on the invasive nature of the neoplasm, a diagnosis of low grade endometrial stromal sarcoma (LGESS) was rendered, and the patient was scheduled for further tumor staging and regular follow-up cancer care, due to the metastatic potential of LGESS. Synchrotron

phase contrast micro-CT (SR μ CT) of formalin fixed, paraffin embedded tumor tissue provided a remarkably detailed three-dimensional view of the tumor's distinctive invasive growth pattern (Video 1).¹

An invasive growth pattern and/or lymphovascular invasion are the only features reliably discriminating LGESS from endometrial stromal nodule (ESN), its benign and molecularly often indistinguishable (eg, identical *JAZF1-SUZ12* gene fusion) counterpart.² Therefore, the distinction between ESN and LGESS cannot be made with certainty on the basis of limited tissue samples, such as curettage, but requires evaluation of the entire tumor interface with adjacent myometrium, usually in hysterectomy specimens. Once clinically implemented, novel micro-radiological techniques, allowing for higher spatial resolution and superior soft tissue contrast in comparison with



Video 1 Synchrotron phase contrast micro-CT (SR μ CT) based three-dimensional virtual histology shows the growth patterns of low grade endometrial stromal sarcoma, and endometrial stromal nodule, its benign counterpart.



© IGCS and ESGO 2021. Re-use permitted under CC BY-NC. No commercial re-use. Published by BMJ.

To cite: Kommos FKF, Albers J, Schwab C, et al. *Int J Gynecol Cancer* 2021;**31**:934–935.

imaging techniques currently in clinical use, may facilitate clinical decision making by identifying patterns indicative of malignancy in cases of uterine stromal neoplasms where a fertility sparing surgical approach might be considered.³

Author affiliations

¹Institute of Pathology, University Hospital of Heidelberg, Heidelberg, Germany

²Department of Diagnostic and Interventional Radiology, University Medical Center Goettingen, Goettingen, Germany

³Department of Diagnostic and Interventional Radiology, University Hospital of Heidelberg, Heidelberg, Germany

⁴Translational Lung Research Center Heidelberg, German Center for Lung Research, University of Heidelberg, Heidelberg, Germany

⁵Elettra-Sincrotrone Trieste, Trieste, Italy

Contributors FK and CS performed the histological work-up. JA, WLW, GT, and CD performed synchrotron phase contrast micro-CT (SR μ CT) imaging. FK wrote the manuscript, which was reviewed and approved by all of the authors.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement There are no data in this work.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, an indication of whether changes were made, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

REFERENCES

- 1 Saccomano M, Albers J, Tromba G, *et al*. Synchrotron inline phase contrast μ CT enables detailed virtual histology of embedded soft-tissue samples with and without staining. *J Synchrotron Radiat* 2018;25:1153–61.
- 2 Hoang L, Chiang S, Lee C-H. Endometrial stromal sarcomas and related neoplasms: new developments and diagnostic considerations. *Pathology* 2018;50:162–77.
- 3 Labriet H, Nemoz C, Renier M, *et al*. Significant dose reduction using synchrotron radiation computed tomography: first clinical case and application to high resolution CT exams. *Sci Rep* 2018:8.