

Convolutional neural network for the analysis of histology slides in Oncofertility

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Background: The emerging field of onco-fertility brings together oncology and reproductive endocrinology specialties to maximize the reproductive potential of cancer patients and survivors. Therapies involve procedures performed prior to the beginning of cancer treatment in an effort to preserve options for both men and women related to future conception and completion of a successful pregnancy. Histopathology analysis can help predict the success of different fertility preservation procedures. Currently, a lab technician needs to analyse the histology slides manually. This is a slow process – either counting ovarian follicles and follicle type in ovarian tissue, or determining the stage of spermatogenesis and presence of sperm in testicular tissue we want to train CNNs to automate this manual process.

Methods: A systematic review was conducted using the PubMed, Embase, Scopus, and Web of Science databases in Feb 2024. We performed the search strategy with keywords, namely: Ovarian Cancer, Artificial intelligence, and precision Oncology along with their synonyms in the article titles. Descriptive, qualitative, review, and non-English studies were excluded. The quality assessment of the articles and evaluation of bias were determined based on the SJR journal and JBI indices, as well as the PRISMA2020 guideline.

Result: Seventeen studies using various deep learning methods achieved a satisfactory outcome in predicting treatment response and prognosis, contributing to personalized ovarian cancer management and predict Oncofertility status.

Conclusion: The use of CNN in ovarian and testicular tissue analysis leads to innovation in clinical care. In addition, allows Oncofertility Centers to analyze tissue at a higher speed. It leads to the ability of doctors to analyze tissue slides of patients and easy access to patients' information, and finally makes optimal decisions for doctors to help patients.

Keyword: CNN, Oncofertility, uterus and ovaries

