



3rd International Conference on

GYNECOLOGY, OBSTETRICS AND WOMEN'S HEALTH

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Title: Early detection of risk for Uterine Cancer by Artificial Intelligence / Machine Learning (AI/ML).

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Abstract (upto 300 words)

Background: Incidence of uterine cancer have increased in the past 4 decades, with 12% increase in new cases and 21% increase in deaths. Survival is 75-90% if diagnosed by stage I and II, but drops to 60-20% by stage III and IV respectively. In addition, symptoms of uterine cancer mimics other organ systems resulting in misdiagnosis.

Objective: AI/ML has the potential to identify the risk for uterine cancer before the symptoms appear, using routine blood markers.

Methods: ML models were trained with over 3000 sets of data from patients with and without uterine cancer from MIMIC IV. A gradient boosted model produced optimal performance. The input parameters consisted of age and the results of routine blood markers recorded up to 3 years before a diagnosis of uterine cancer was identified. An evaluation of performance was conducted using the area under the curve (AUC).

Results: The model had an AUC of 0.97 and accuracy of 0.93. This model was able to predict the risk of uterine cancer with 0.91 sensitivity and 0.95 specificity with a positive predictive value of 0.94 and a negative predictive value of 0.91. Lipids, glucose, alkaline phosphatase, chloride, hematocrit contributed to the identification of the risk.

Conclusion: Studies have shown that endometrial cancer has significantly dysregulated lipid metabolism. High blood glucose levels can provide a carbon source for tumor growth and increase glucose uptake in endometrial cancer cells. Some studies have investigated the link between metabolic syndrome, which includes dyslipidemia and hyperglycemia, and endometrial cancer. Chloride and sodium channels, are shown to be involved in cancer progression. Increase in hematocrit values in endometrial cancer can be explained by tumor-induced secretion of erythropoietin. Thus AI/ML models could identify the risk for uterine cancer before the symptoms appear enabling identification and prompt treatment early resulting in better survival.



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Biography (upto 150 words)

Raj Gopalan is a senior physician executive with more than 35 years of experience, both in clinical medicine and healthcare information technology. He is an internal medicine physician, as well as a National Library of Medicine fellow with formal training and degree in medical informatics. He has published several articles on cancer research and artificial intelligence in distinguished scientific journals. He worked as medical informaticist at US Oncology, Director of information systems at UNC Health, Chief Medical Information Officer (CMIO) at Advent Health, VP of innovation, informatics and data science at Wolters Kluwer and CMIO and global head of clinical decision support at Siemens Healthineers Diagnostics. He has shown that AI based prediction models would help identify patients at risk for life threatening diseases like Cancer, Sepsis, Liver and Kidney Diseases using routine blood test. AI/ML can also assist in therapy selection and monitoring.

Recent publication:

- Artificial Intelligence (AI) driven Clinical Decision Support: Potential to predict the risk for multiple sclerosis. (Blue Ribbon award for scientific excellence). Association of Diagnostics & Lab Medicine (ADLM), July 2023.
- Concordance and generalization of an AI algorithm with real-world clinical data in the pre-omicron and omicron era. International Federation of Clinical Chemistry, May 2023.
- Artificial Intelligence (AI) driven Clinical Decision Support: Potential to predict the risk for Coagulation Disorders. International Society for Laboratory Hematology, May 2023.
- Where is laboratory medicine headed in the next decade? Partnership model for efficient integration and adoption of artificial intelligence into medical laboratories Clinical Chemistry and Laboratory medicine, Nov 2022.
- The role of modern laboratory diagnostics in supporting clinicians' decision making, Medical Laboratory Online, Oct 2021.

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