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Computer aided screening of cervical cancer using methodologies of quantitative cytology

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Cervical cancer is the fourth most common cancer among women with an estimated 528,000 new cases every year. Among the different screening methods, cytology based screening using Pap smear remains as the best method for the pre-selection of women with cervical intraepithelial lesions. However, this method poses a challenge in practical implementation as it isresource intensive requiring trained professionals skilled enough to identify a handful of abnormal cells among few hundred thousand cells. This motivates the need for automating the screening methodology. Since the 1960's several groups have attempted such automated screening systems leading also to a couple of commercial products. Still these have had limited impact on the screening situation in most of the world. C-DAC(T) together with RCC-T and Uppsala University has developed a semi-automated system which analyses digitized PAP slides prepared using LBC techniques and employs quantitative analysis using image processing and machine learning algorithms to screen outclearly normal smears and direct abnormal smears for human review. A low cost alternative to commercial LBC technique was also identified. The system filters out normal smears without human intervention while referring the suspicious cases for expert's review. It was evaluated on 1006 smears with a sensitivity of 96% and specificity of 72% for high grade lesions, which is comparable to that of human experts. Since in screening programs a big majority of cases are within normal limits, the system is able to drastically reduce the workload of Cytologists thus able to screen a larger population even in low resource settings.

Biography

K Sujathan has done his PhD in Faculty of Science and Advanced Training in Workshop and Residential Course on Molecular Diagnostics in Oncopathology, TMH & ACTREC, Mumbai. He also had hands on Training in Molecular biology techniques, Cancer Institute, Adayar, Chennai and a Training Course in Micronuclei Technique, Department of Radiobiology, Kasturba Medical College-India, training on Biological Transmission Electron Microscopy, Cancer Research Institute, Tata Memorial Center, Bombay, India. During 1987-1996, he worked as a Cytotechnologist at Regional Cancer Centre and became Senior Cytotechnologist in the year 1997, then in the year 2005, he was appointed as Assistant Professor in the Division of Pathology and currently, he is working as an Associate Professor at the Division of Cancer Research, Regional Cancer Centre (2012 to till date).

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