Laser induced fluorescence (LIF) spectroscopic investigation of cervix tissue for the detection of chronic cervicitis

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INTRODUCTION

- Cervical cancer starts in the cells lining of the cervix which is the lower part of the uterus. This is sometimes called the uterine cervix.
- Cervical cancer fourth most common cancer among women all over the world[1] and in India, about 123,000 women diagnosed and ~67000 die every year[2].
- The detection of any abnormality like chronic cervicitis (CC), low grade squamous intraepithelial lesion (LGSIL) and high grade squamous intraepithelial lesion (HGSIL) may prevent further progression diseases.
- Optical techniques are explored for the early detection and diagnosis for diseases in which laser induced fluorescence (LIF) is one of the simple methods for the detection of various types of cancers and also capable of discriminating normal and abnormal tissue sample without the necessity of exogenous fluorophores.

MATERIAL AND METHODS

- Cervix tissue samples were collected from the Department of Obstetrics & Gynaecology, Kasturba Medical College, Manipal Academy of Higher Education, Manipal, with written consent and institute ethical committee approval.
- Normal tissue sample were collected from patient undergone hysterectomy for other reason than cervical cancer. Also tissue from volunteers who were advised for biopsy after colposcopy examination were collected with written consent.
- The cervix tissue was excited using a He-Cd laser at 325 nm wavelength having power 190μW at tip of optical fiber probe. The fluorescence signal was recorded using charge-coupled device (CCD) spectrometer. The fluorescence spectra were recorded at 0.2 second exposure time and 20 accumulations from different sites of the same tissue sample.

RESULTS AND DISCUSSION

- Laser induced fluorescence (LIF) spectra was recorded by exciting with 325 nm wavelength laser and peaks of collagen and NADH was observed around 390 and 440 nm respectively.
- The fluorescence intensity of collagen and NADH is different for normal and chronic cervicitis tissue. The normal cervix tissue shows more intense collagen fluorescence.
- In case of chronic cervicitis the intensity of NADH fluorescence was observed to be increased in relative to normal tissue.
- It has been reported that the 325nm wavelength excitation used for fluorescence provides better discrimination of normal and malignant than other wavelength [3].

CONCLUSION

- In the present work, LIF studies have been performed using cervix tissues obtained from volunteers who have undergone hysterectomy.
- The chronic cervicitis sometimes lead to LGSIL and HGSIL. If it is not diagnosed at proper time it may end up in cervical cancer[4]. It can be a real time technique to find the abnormalities in the cervix tissue.
- The technique has proven to be a reliable technique for the early detection, in vivo screening and surgical demarcation.

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