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A New Modified Autofluorescence Pleuroscopy in the Undiagnosed Lung Cancer With Pleural Effusion

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Background: Autofluorescence bronchoscopy (AFB) was developed to enhance the detection of lung cancer in the airway. The value of AFB in detecting early lung cancer or carcinoma has been evaluated in many research settings. However, its role in the work up of pleural space has not been evaluated. So We used a flexible bronchoscope (SAFE 3000, Pentax, Tokyo) to entry a pleural space with undiagnosed lung cancer with pleural effusion.
Materials and Methods: We used chest sonography to locate the entry. Then the endoscopy went through a tocar 5.5 mm under local anesthesia; We used a flexible bronchoscope (SAFE 3000, Pentax, Tokyo) to entry a wound which was less than 1 cm. A 16 Fr pig pig-tailed catheter inserted after the procedure. All abnormal lesions detected by white light bronchoschopy (WLB) or AFB were biopsy for histological examination Then the clinical data retrospectively studied. The whole procedures were done either in the bedside or endoscopic room.
Results: 22 patients were recruited. There were 6 patients with cytology negative and normal finding in WLB or AFB but 2 of them were found to have lung cancer. Among the 16 patients with atypia or suspicious cells had abnormal finding in the WLB or AFB, 15 patients of them had finally diagnosis of lung cancer. Lung cancer were more commonly found in those cytology with suspicious cells. AFB was also more sensitive than WLB (93% versus 53%) at detecting the abnormal lesion in pleural space.
Conclusions: This is a new modified pleuroscopy used for detecting the undiagnosed lung cancer with pleural effusion; especially for those cytology with suspicious cells. This is a daily practice not only performed in the endoscopic room but also in the bedside.

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A Novel Biodegradable Balloon (BioProtect SpaceGuard™) Reduces Inter-fraction Prostate Motion and Provides Reproducible Geometry in Patients Receiving IMRT for Prostate Cancer

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Background: To assess intra-fraction prostate motion and positioning during radiation therapy in patients undergoing placement of BioProtect SpaceGuard™ biodegradable balloon in the rectal-prostate interface.
Methods: 23 prostate cancer patients from 5 institutions underwent transperineal insertion of a biodegradable balloon under TRUS guidance as part of a phase I study.
CT scans were performed prior to, after implant and during follow up. For 2 patients, during treatment, CT scans were acquired weekly. Contours of the organs and balloon for all scans were drawn by the same MD. Geometric analysis (positioning, volumes, displacement, and deformation) of the organs and balloon was carried out relative to bony landmarks. Patients were all planned to 75.6 Gy and DVH analysis performed. In addition, 18 of these 23 patients underwent measurements of balloon, prostate-rectal distance and balloon non dislocation by independent imaging specialist.
Results: The balloon displaced both the prostate posterior wall (11 mm; range: 5−18 mm) and anterior rectal wall (10 mm; range: 6−16 mm) along the interface while the anterior surface of the prostate and posterior surface of the rectum were displaced less (5 mm; range: 0−12 mm). The gap introduced by the balloon was 24.7±4.7 mm, 24.1±4.3 mm, and 15.9±0.6 mm for post implantation, during XRT and at 3 months post implantation, respectively. This gap resulted in a mean V65 of 4.3% (range: 0%-11.7%) compared to 14.5% (range: 11.1%-20.5%) before implant. Similarly, mean V70 changed from 12.2% (range: 9.3%-17.1%) to 3% (range: 0%-9.7%).
There was minimal change in position of the prostate posterior wall (2.5 mm, Range: 0.7−4.3 mm) and rectal anterior wall (2.8 mm, 1.5−5.1 mm) during treatment.
Follow up scans showed degradation of the balloon 90 days post treatment.
Conclusions: Bioprotect creates uniform and stable space between prostate and anterior rectal wall therefore reducing rectal dose significantly. The balloon seemed to acts as buffer for prostate inter-fraction displacement from changes in rectal volume. In our study, the inter-fraction motion of prostate was significantly less than reported in the literature. Larger study is planned to assess inter and intra-fraction prostate motion using BioProtect SpaceGaurd®.

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Coping With the Data Deluge: the Quartz Software Platform for the Management, Visualisation and Analysis of Large Scale, Multimodal Genomic and Bioimage Data

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Background: Recent advances in genomic and bio-imaging technologies will only prove useful to the extent that the data they produce can be adequately visualized, analysed and interpreted. Indeed hardware improvements whether in resolution, speed, cost or novel imaging modality, present the oncology community with new challenges: the acquired data are increasingly bigger (e.g., SNP arrays now feature millions of probes, high-resolution histo-pathology images are often larger than a gigabyte), online databases accumulate ever more entries, multimodal studies comprise all sorts of data: clinical, imaging, genomic, etc. In these respects the realization of the immense potential of advanced hardware technologies is conditional upon the development of equally sophisticated software approaches capable of handling the size, number and heterogeneity challenges of this data deluge.
Methods: Ilixa's Quartz is a software platform capable of managing, visualizing and analysing heterogeneous datasets of arbitrarily large size. It was designed from the ground up for high-throughput applications requiring flexible, fast and scalable handling of data. The platform makes it possible for programmers to focus on the actual application features, rather than worry about memory, speed or visualization. In essence, it offers a high-performance, integrated environment to facilitate the design, rapid-prototyping and development of advanced, bespoke, user-friendly oncology tools.
Results: Taking advantage of the capabilities offered by the platform, we have developed for our research and clinical collaborators a number of genomic and bioimaging applications. In particular, we have to date delivered analysis software packages for (1) high-throughput microarray technology with the ability to handle thousands of samples from a variety of platforms and technologies (SNP arrays, aCGH, expression and methylation data, etc.); (2) visualization and analysis of karyotypes and (3) multimodal visualization and image analysis for MRI and histology/ immunohistochemistry, later adapted for the reconstruction of 3-D histological volumes.
Conclusion: In view of the daunting challenges facing genome and biomedical informatics, Ilixa believes that the Quartz platform can play a key role in catalysing the delivery of innovative solutions by streamlining the translation of ideas and concepts into efficient tools.

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INTEGRATE: Driving Excellence in Integrative Cancer Research Through Innovative Biomedical Infrastructures

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Background: While the healthcare industry continues to improve its capabilities for electronic data capture, a gap remains in the ability of IT systems to deliver knowledge back to the researchers and clinicians they are intended to support. The fragmentation of infrastructures and tools used in clinical research and care, together with the lack of common methodologies and of sufficient high quality data, may make research a difficult task, especially in the case of high resolution genomic translational research projects in oncology.
Methods: We address the current low integration of information by focusing on main barriers such as the lack of interoperability and the low adoption of standards, and aim to build and provide access to large, high quality datasets (including data, annotated models, and metadata). We also develop a flexible infrastructure for information sharing in biomedical research, to bring together heterogeneous multi-scale biomedical data generated through standard and novel technologies within post-genomic clinical trials.
The environment will be designed and validated in the context of the Neo-BIG research programme of neoadjuvant trials of the Breast International Group (BIG), developed specifically to enhance and accelerate biomarker discovery and validation in early drug development in breast cancer.