Conclusions: Video conference facilitates the centralization of decision making on treatment in an efficient way. Patients with complex tumours can count on assessment and decision making by experts at the highest possible quality level. The roll out of this good practice is planned for other tumours.

2165 POSTER

Targeting of Interferon Gamma to Stromal Fibroblasts Using a PDGF Receptor Recognizing Carrier Reduces Tumour Growth in Vivo

J. Prakash[1], R. Bansal[1], T. Tomar[1], A. Ostman[2], K. Poelstra[1]. [1]*Groningen Research Institute for Pharmacy, Pharmacokinetics Toxicology and Targeting, Groningen, The Netherlands;* [2]*Karolinska Institute, Oncology-Pathology, Stockholm, Sweden*

Background: Stromal fibroblasts are the key cell types in tumour stroma, that support angiogenesis, tumour cell proliferation and metastasis. Therefore, inhibition of stromal fibroblasts activity might inhibit tumour growth. Interferon gamma (IFNγ) is a potent cytokine and has been used for the treatment of experimental fibrosis. However, poor pharmacokinetics and severe side effects prevented its clinical application. In this study, we hypothesized that specific delivery of IFNγ to stromal fibroblasts may be beneficial to inhibit the tumour growth. Since Platelet-derived Growth Factor beta receptor (PDGFβR) is abundantly expressed on stromal fibroblasts, we developed a PDGFβR-specific drug carrier (PPB-HSA) by modifying albumin with a PDGFβR-recognizing cyclic peptide to deliver IFNγ.
Materials and Methods: The IFNγ was conjugated to PPB-HSA carrier via a heterobifunctional PEG linker and characterized with Western blot analyses and nitric oxide release assay in RAW monocytes. In vitro, PPB-HSA-IFNγ was examined for its effectivity in 3T3 fibroblasts using wound healing assay, immunocytochemistry and qRT-PCR. To simulate fibroblasts-induced angiogenesis process, tube formation assay was developed in which conditioned medium from 3T3 fibroblasts (incubated with TGFβ and IFNγ or IFNγ constructs) was added to the endothelial cells (H5V) and tubes formed were counted. In vivo, the effects of the targeted PPB-HSA-IFNγ on tumour growth were determined in subcutaneous B16 melanoma tumour model in mice. Treatments with vehicle, IFNγ, PPB-HSA-IFNγ, PPB-HSA ($n = 5$ per group) at the equivalent doses (5 μg/dose/mouse) were administered intravenously.
Results: PPB-HSA-IFNγ construct was successfully synthesized and the conjugated IFNγ retained its biological activity. The construct showed PDGFβR-specific binding in 3T3 cells which was blocked with anti-PDGFR antibody. The IFNγ construct significantly inhibited the proliferation and migration of 3T3 cells as determined with wound healing assay. Treatment with the targeted IFNγ drastically reduced TGFβ-induced collagen-I, alpha smooth muscle actin and fibronectin expression in staining and gene expression. Furthermore, the PPB-HSA-IFNγ inhibited the 3T3 fibroblasts-induced angiogenesis as determined with the tube formation assay in H5V cells. In vivo, the targeted IFNγ construct attenuated the tumour growth by 60% ($p < 0.01$) compared to vehicle whereas untargeted IFNγ and PPB-HSA carrier did not induce any reduction in the tumour growth.
Conclusions: These data demonstrate that specific targeting of IFNγ to the stromal fibroblasts using PPB-HSA carrier is a potential therapeutic strategy to inhibit tumour growth.

Poster Presentations (Sat, 24 Sep, 14:00−16:30)
Surgical Techniques

2500 POSTER

Identification and Image-guided Resection of Occult Superficial Liver Metastases Using Indocyanine Green and Near-infrared Fluorescence Imaging

J.R. van der Vorst[1], M. Hutteman[1], B.E. Schaafsma[1], J.S.D. Mieog[1], F.P.R. Verbeek[1], G.J. Liefers[1], H.H. Hartgrink[1], J.V. Frangioni[2], C.J.H. van de Velde[1], A.L. Vahrmeijer[1]. [1]*Leiden University Medical Centre, Surgery, Leiden, The Netherlands;* [2]*Beth Israel Deaconess Medical Center, Medicine and Radiology, Boston, USA*

Background: Near-infrared (NIR) fluorescence imaging using indocyanine green (ICG) is a promising technique for identifying and resecting colorectal liver metastases, however, optimal dosage and timing is not known.
Material and Methods: The Mini-FLARE™ imaging system was used for real-time identification of colorectal liver metastases in 22 patients undergoing liver resection. NIR fluorescence imaging was performed 24 or 48 h after administration of 10 or 20 mg ICG. Resected specimens were prepared for *ex vivo* macroscopic and microscopic evaluation of fluorescent patterns.
Results: A total of 40 superficially located (<6.2 mm beneath the liver capsule) colorectal liver metastases were identified and resected using NIR fluorescence imaging and ICG. In all patients, ICG fluorescence was seen as a rim around the tumour, located microscopically in the transition zone between tumour and normal liver tissue. Median tumour-to-liver ratio (TLR) was 7.4 (range 1.9–18.7) and no significant differences between time-points or doses were found. NIR fluorescence signal in normal liver had returned to baseline by 24 to 48 hours post-injection, eliminating the need to test longer time-points. Four metastases detected using NIR fluorescence were occult, and not visible using preoperative CT, palpation, or intraoperative ultrasound (IOUS). NIR fluorescence also distinguished benign liver lesions from metastases. Preoperative CT, IOUS, and/or palpation, however, found seven lesions, all deeper than 8 mm, which were not seen using NIR fluorescence.
Conclusion: This study suggests that NIR fluorescence imaging is complementary to conventional imaging for liver metastasectomies, and has the potential to improve surgical cure.

2501 POSTER

Three-Dimensional Imaging Navigation Using an IPad During a Lung Segmentectomy

T. Eguchi[1], K. Takasuna[1], A. Kitazawa[2], Y. Fukuzawa[2], Y. Sakaue[2]. [1]*Ina Central Hospital, Thoracic Surgery, Ina, Japan;* [2]*Ina Central Hospital, Radiology, Ina, Japan*

Background: Lung screening using computed tomography (CT) has recently become widespread and many small lung lesions have been detected using this method. The requirement for anatomical lung segmentectomies has also therefore increased. We herein present the benefits of using three-dimensional (3D) imaging navigation during a lung segmentectomy via the intraoperative use of an iPad.
Materials and Methods: Images were obtained using a 16-channel multi-detector CT (MDCT). Contrast agent was injected at a rate of 5 ml/s (total dose, 1.2 ml/kg) and this was followed by a 40 ml injection of normal saline injection to wash the contrast agent from the pulmonary artery (PA). Contrast-enhanced scanning was then performed twice, at 7 seconds after the start of the injection for enhancement of the PA and at 18 seconds after the injection for enhancement of the pulmonary vein (PV). 3D images were constructed from 1.0 mm data slices using a workstation. Images of the PA, PV, airway (from the trachea to the subsegmental bronchus) and of the tumours to be resected were constructed separately and subsequently merged. These 3D images were then transferred to an iPad and analyzed during the operation using DICOM image viewer software. In the operating room, the iPad was placed inside a sterile bag and manipulated directly by the surgeons in the operative field.
Results: We performed six segmentectomies (right S1, right S2, right basal segment, left S1+2, left upper division, and left basal segment) between October 1, 2010 and March 31, 2011 using this procedure. Preoperatively, we identified the branches of pulmonary artery, pulmonary vein, and bronchus in the affected or adjacent segment using the 3D images, and simulated which branches should be divided or preserved for necessary and sufficient resection. During the operation, the surgeons were able to review and manipulate the 3D images interactively, and to easily identify actual anatomical structures.
Conclusion: A 3D-CT navigation using an iPad enhances the ability to perform a safe and secure segmentectomy.

2502 POSTER

Microwave Ablation of Ex Vivo Human Liver and Colorectal Liver Metastases With a Novel 14.5 GHz Generator

R. Jones[1], D. Dunne[1], M. Terlizzo[2], S. Fenwick[1], H. Malik[1], G. Poston[1], N. Kitteringham[3], P. Ghaneh[4]. [1]*University Hospital Aintree NHS Foundation Trust, Department of Hepatobiliary Surgery, Liverpool, United Kingdom;* [2]*University Hospital Aintree NHS Foundation Trust, Department of Histopathology, Liverpool, United Kingdom;* [3]*University of Liverpool, Department of Pharmacology, Liverpool, United Kingdom;* [4]*University of Liverpool, Division of Surgery, Liverpool, United Kingdom*

Background: Ablation of colorectal liver metastases relies on the focal delivery of energy to a lesion causing tumour destruction. Targeted ablations minimise the removal of healthy parenchyma, and are useful in patients with borderline parenchymal volume and function, or anatomically difficult lesions which may not be amenable to formal resection. Previous attention has focused on radiofrequency ablation (RFA). Interest is now turning to microwave ablation which offers several theoretical advantages. Microwave radiation causes polarised water molecules to oscillate, generating heat by an active mechanism. This active heating mechanism means microwave energy is not reduced by transmission through charred and desiccated tissue, allowing more controlled and predictable tissue