Title   Time since death estimation by the method of laser
          polarimetry of polycrystalline cerebro-spinal fluid
          films images
Presenter   Marta Garazdiuk
Author   Marta Garazdiuk
Co-authors   O.Garazdiuk, O.Vanchuliak, Yu. Sarkisova

Introduction:

Time since death (TSD) estimation is an important and controversial issue in forensic practice. In our opinion, laser polarimetric methods are very perspective for its solving.

Purpose: to develop and to test two-dimensional Stokes-polarimetric mapping of biological layers own fluorescence to evaluate accuracy of the TSD assessment using statistical analysis of postmortem changes of coordinate distributions values of polycrystalline films of liquor (PFL) images laser-induced fluorescence polarization azimuth (LIFPA).

Materials and methods:

Objects of investigation are PFL, taken in 37 corpses with accurately known time of death and 10 healthy volunteers. Coordinate distributions of LIIFPA image values were determined for each sample of PFL in the optical arrangement of the Stokes polarimeter in different spectral bands of optical radiation. The value of statistical points 1 - 4 th order was performed for each two-dimensional distribution of PFL images LIFPA values. Statistical processing of the calculated values of set of points that characterize the LIIFPA distributions within representative sampling was carry out. The depending on the time change of the most sensitive points of statistical values were built to achieve values stabilization.

Results and conclusions:

Two-dimensional Stokes-polarimetric mapping distributions LIFPE of PFL images may be used in determination of the TSD. Statistical points of the 3rd and 4th order are the most sensitive PFL optical values to evaluate postmortem changes by short-range fluorescence. Statistical points of the 2rd and 4th order are the most sensitive PFL optical values in case of using media- and long-wavelength range of fluorescence They characterize PFL images PE values variance and kurtosis distribution. Dynamic changes of PFL laser have demonstrated the effectiveness of this method to estimate TSD.

9

Title   Detecting chronic pain patterns in FMRI data.
Presenter   Lukas Piliponis
Author   Lukas Piliponis
Co-authors   J. Ušinskienė, G. Terbetas

Introduction:

Failed Back Surgery Syndrome (FBSS) is a condition of persisting low back pain with or without lumbosacral radiculopathy after 1 or more spine surgeries. Main preoperative risk factors are depression, > than 6 months continuous pain and preexisting neuropathic pain. Spine surgery in chronic low back pain has poor results because of the central sensitization at the level of spinal cord and the „pain matrix" of the central nervous system. The main clinical application of pain fMRI would be to contraindicate surgery as a treatment method for atients with altered pain perception and functional brain activity.

Materials and methods:

To investigate the pain functional consequences, we recorded resting state fMRI followed by block design pain stimulation in FBSS patient with chronic low back pain and neurotypical control who matched in age and sex. Pain stimulus was given via clip compressing distal phalanx of right-hand index finger. The fMRI was performed with GE Optima 450w 1.5T scanner. fMRI images were analysed with SPM12.

Results:

We studied the difference in pain activations and resting state between both participants. The threshold for functional activity was selected as 30 voxels (p=0.001). Pain activations showed differences in FBSS patient: anterior and posterior right insular cortices (IC), both supplementary motor areas (SMA), left primary visual cortex (V1) and both sides of the occipital middle-inferior gyri.

Conclusion:

The diagnostic approach of chronic pain patterns using fMRI could help preventing FBSS. With further larger case-control study research we seek to develop an evident model of chronic pain activation for diagnostic purposes.

10