Frontal transcortical approach

Pathologies occupying the interventricular foramen or the anterior part of lateral ventricle (LV) are accessed by the transcortical or transcallosal route. As severing of rostral corpus callosum has been deemed inferior to cortical incision, the approaches through various points of frontal lobe have been developed. Superior (F1), middle (F2) frontal gyrus or occasionally superior frontal sulcus are used as an entry of neurosurgical corridor. In spite of the fact that every approach to LV or FM causes its characteristic irreversible damage to white matter, to date all of transcortical routes are regarded as equivalent. The current study compared the damage of main neural bundles between virtualtrans-F1 and trans-F2 corridors by means of diffusion tensor tractography method (DTT) in 11 magnetic resonance imaging (MRI) exams from clinical series (22 hemispheres, regardless of dominance). Corpus callosum, cingulum, subdivisions I and II of superior longitudinal fasciculus (SLF I and SLF II), corticoreticular as well as pyramidal tracts crossing both approaches were subjected to surgical violation. Both approaches served a similar total number of fibres (0.94 to 1.78 [× 103]).Trans-F1 route caused significantly greater damage of total white matter volume(F1: 8.26 vs. F2: 7.16 mL), percentage of SLF I fibres (F1: 78.6% vs. F2: 28.6%)and cingulum (F1: 49.4% vs. F2: 10.6%), whereas trans-F2 route interrupted morecorticoreticular fibres (F1: 4.5% vs. F2: 30.7%). Pyramidal tract (F1: 0.6% vs. F2:1.3%) and SLF II (F1: 15.9% vs. F2: 26.2%) were marginally more vulnerable incase of the access via middle frontal gyrus. Both approaches destroyed 7% of callosal fibres. Summarising the above DTT findings, trans-F2 route disrupted a greater number of fibres from eloquent neural bundles (SLF II, pyramidal and corticoreticular tracts), therefore is regarded as inferior to trans-F1 one. Due to lack of up-to-date guidelines with recommendations of the approaches to LV or FM, an individual preoperative planning based on DTT should precede a surgery [1)].

1)
Szmuda T, Słoniewski P, Szmuda M, Waszak PM, Starzyńska A. Quantification of white matter fibre pathways disruption in frontal transcortical approach to the lateral ventricle or the interventricular foramen in diffusion tensor tractography. Folia Morphol (Warsz). 2014;73(2):129-138. doi: 10.5603/FM.2013.0063. PubMed PMID: 24902089.