SUMMARY

Osteoplasic decompressive craniotomy

Background:

Decompressive craniectomy (DC) is a essential medical procedure used as a treatment of the patients with a refractive intracranial hypertension. It is accompanied by a high rate of postoperative complications. Along with a cranioplasty, these procedures might burden the patients with a significant morbidity, thus lowering the potential benefits of the surgery. Osteoplastic decompressive craniectomy (ODC) is an alternative surgical method suitable for those patients, for whom a DC might be too radical. The aim of our study was to introduce the technique of this often-ignored surgical procedure, to compare the outcome of the patients with DC and ODC, to confirm the ability of ODC to effectively lower the intracranial pressure (ICP) and to attempt to define indications for this surgical procedure. The secondary aim was to investigate possibly lower morbidity of the ODC patients, lower costs of provided care and to try to define causes of the failure of the method in patients, in whom it proved to be insufficient.

Patients and methods:

In the study were included 33 patients, who underwent a hemispheric ODC. This group was compared with a retrospective control group consisting of patients, who underwent a hemispheric DC. The proportion of intracranial pathologic processes was identical in both groups. Preoperative clinical condition (mGCS, anisocoria) and clinical outcome (GOSe) after 6 months were evaluated. Multiparametric ICP analysis was performed, preoperative and postoperative CT findings were evaluated (Rotterdam score, number of pathologies, midline shift, perimesencephalic cisterns, uncal herniation, external brain herniation, size of decompression). Perioperative and hospitalization data were compared (duration of surgery, size of dura mater defect, malfunction of surgery, complications, length and cost of hospitalization).

Results:

Preoperative clinical status of the patients in the ODC group was better with higher mean preoperative mGCS, but the difference was not statistically significant (p=0,06).

In the DC group there was a higher rate of the number of pathologies on CT scan (p=0,0017) and higher rate of anisocoria (p=0,0013).

There was a lower rate of the effaced perimesencephalic cisterns in the ODC group (p=0,0089). Rotterdam score was also lower in the ODC group (p=0,0002).

In the ODC group was significantly smaller dura mater defect intraoperatively (p=0,0001).

Preoperative ICP was significantly lower in the ODC group (p<0,0001). Adequate control of postoperatice ICP was achieved in both groups, an average postoperative ICP difference between the both groups was statistically insignificant (p=0,4381).

In the DC group there was a higher volume of the herniated brain tissue (p<0.0001), and more severe brain herniation outside the craniectomy (p<0,0001).

In the ODC group there was a lower rate of postoperative complications (p=0,0267).

Reoperation for inadequate decompression was performed in 3 cases in the DC group and 7 cases in the ODC group, the diference was statistically insignificant (0,01697).

In the ODC group there was significantly shorter stay at the ICU (p=0,0198), shorter mechanical ventilation period (p=0,0009) and shorter hospital stay (p=0,0248). Hospitalization costs were 25% lower in the ODC group on average (p=0,0257).

Clinical outcome after 6 months period was significantly better in the ODC group (p=0,0029).

Conclusion:

ODC is an alternative method of the DC intended for the patients with a less severe intracranial expansion, in whom it effectively lowers the refractive intracranial hypertension. ODC is associated with a lower rate of the postoperative complications, a shorter hospital stay, lower costs of the care, better clinical outcome and it is not accompanied by a significantly higher rate of malfunction.