

Simultaneous Cranioplasty and ventriculoperitoneal shunts are associated with increased complications when compared to staged procedures.

Authors: Christian Mustroph, B.S.;, James Malcolm, Ph.D.; Rima S Rindler, MD; Jason K Chu, MD; Jonathan A Grossberg, MD; Gustavo Pradilla, MD; Faiz Ahmad, M.D., M.Ch.

Introduction:

Hydrocephalus is a common complication following decompressive craniectomy and often requires the placement of a ventriculoperitoneal shunt (VPS). Outcomes of subsequent cranioplasty have been investigated in regards to timing of cranioplasty, presence or absence of a VPS, but not in regards to simultaneous or staged cranioplasty and VPS. This meta-analysis compares complication rates in patients undergoing simultaneous and staged cranioplasty and VPS.

Methods:

PRISMA guidelines were used to perform a literature search using PubMed. Articles were included if they reported complication rates (infections, resorption, reoperation, ICH, EDH, SDH, and hydrocephalus. in relation to a staged or simultaneous cranioplasty and VPS. All articles reported event rates from which odds ratios [OR, 95% Confidence Interval (CI)] of summed complications were calculated. Data was pooled using the Mantel-Haenszel method using a random-effects model due to high heterogeneity.

Results

Five studies reported complications which could be stratified into simultaneous or staged VPS. The pooled rate of all complications in simultaneous and staged VPS was 23.3% (n=66/283) ranging from compared with staged surgeries (n=22/172, 12.8%, OR 2.65, CI 1.41-4.97, p<0.005) using a random-effects model ($I^2= 61\%$, p=0.04).

Conclusion

Simultaneous VPS and cranioplasty is associated with increased rates of complications compared to staged procedures. Surgeons should consider staging these procedures when possible and counsel patients about these risks.

Education Objectives:

1. Simultaneous VPS and cranioplasty is associated with an increased rate of complication compared to staged procedures.
2. In susceptible patient's surgeons should consider staging these procedures.