

Cranioplasty infection and resorption are associated with presence of a ventriculoperitoneal shunt: A Systematic Review and Meta-Analysis

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INTRODUCTION

Following decompressive craniectomy, hydrocephalus is a common complication often requiring placement of a ventriculoperitoneal shunt (VPS) prior to cranioplasty. Several recent studies have reported complications following subsequent cranioplasty and have identified the presence of a shunt to be associated with infection and bone resorption, but these findings vary. This study reports a systematic review and meta-analysis comparing complication rates in patients undergoing cranioplasty with the presence or absence of a VPS.

METHODS

A systematic literature search adherent to PRISMA guidelines was performed using PubMed. Articles were included if they reported complications related to cranioplasty after decompressive craniectomy and recorded the absence or presence of a VPS at time of cranioplasty. Primary outcomes were infection and resorption. For articles reporting event rates, odds ratios [OR, 95% Confidence Interval (CI)] of infection and resorption were calculated. For articles only reporting OR and CI, these were used to calculate standard error. Data was pooled using the Mantel-Haenszel method using a fixed-effects model.

RESULTS

Six of 93 studies met inclusion criteria (total 1417 patients, 164 shunts). The presence of a VPS was associated with increased rate of resorption requiring reoperation (5 studies, 1304 patients, OR 6.07, CI 3.97-9.30, $p < 0.001$) and with increased rate of infection (3 studies, 467 patients, OR 4.87, CI 2.35-10.10, $p < 0.001$).

CONCLUSIONS

The presence of a VPS at time of cranioplasty is associated with increased resorption and infection. For such patients, surgeons should consider using non-resorptive synthetic materials, extended perioperative antibiotics, and additional infection precautions. Patients should be counseled about these risks.

LEARNING OBJECTIVES

- The presence of a ventriculoperitoneal shunt (VPS) at time of delayed cranioplasty is associated with increased incidence of resorption and infections
- In susceptible patients, surgeons should consider using non-resorptive synthetic implants and extended perioperative antibiotics and precautions