

Perioperative Antibiotic Prophylaxis in Paediatric Cardiac Surgery – is One Day Sufficient to Prevent Surgical Site Infections?

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Objective and Methods

Perioperative antibiotic prophylaxis (PAbP) is a standard practice in paediatric cardiac surgery to prevent surgical site infections (SSI). Current prophylactic regimens in Germany include cefuroxime (second-generation cephalosporin).

The **duration of administration is debated**, due to the lack of randomised controlled trials. The target of antibiotic stewardship is to effectively treat infections, prevent antibiotic resistance and to protect patients from unnecessary harm.

The aim of this retrospective study is to compare the efficacy of PAbP with cefuroxime in two centres with similar patient volumes:

- Congenital cardiac surgery with cardiopulmonary bypass and primary chest closure from 2015 to 2019.
- **Cefuroxime for one or five days** depending on the in-house procedure.

Methods

This retrospective, bi-centre study included patients <18 years of age undergoing congenital cardiac surgery with cardiopulmonary bypass (CBP) and primary chest closure from 2015 to 2019. Patients with preoperative antibiotic treatment or signs of infection and cases of prior surgeries with CBP during the same admission were excluded. PAbP consisted of cefuroxime, which was administered according to two different regimens based on local guidelines: one day (centre 1) versus five days (centre 2). Patients were stratified according to age and procedural risk (STAT score). The endpoints were the duration of invasive ventilation and the duration of postoperative hospitalisation.

Results

587 children were included in the study. STAT score (median 2 vs. 2, $p = 0.86$) were similar. Children were older (median 1,0 vs. 1,5 years, $p < 0.01$) and lighter in centre 2 (mean 13,4 vs. 15,0 kg, $p = 0.04$).

Mean duration of cefuroxime administration was 3,0 days in centre 1, and 6,3 days in centre 2 ($p < 0.01$). The **mean administration of all postoperative antibiotics** (prolonged cefuroxime or escalation to a broader spectrum) was 4,5 days in centre 1, and 7,2 days in centre 2 ($p < 0.01$); this corresponded to a **PAbP escalation of 66% in centre 1 and 55% in centre 2**.

Duration of postoperative hospitalisation (median 14,4 vs. 11,6 days, $p < 0.01$) and mechanical ventilation (mean 1,8 vs. 1,6 days, $p < 0.01$) were longer in centre 1.

None of the centres reported explicit evidence of surgical site infection.

Conclusion

Our results show that longer PAbP is associated with a shorter duration of hospitalization and ventilation. However, age and weight could play a role as possible confounding factors.

There were **no cases of surgical site infections with either PAbP regimen**. In more than half of the cases, PAbP escalation occurred, so it seems that in both centres more antibiotics lead to more antibiotics.

