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[Intervention Review]

Prophylactic steroids for pediatric open heart surgery

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ABSTRACT

Background

The immune response to cardiopulmonary bypass in infants and children can lead to a series of postoperative morbidities and mortality i.e. hemodynamic instability, increased infection and tachyarrhythmias. Administration of prophylactic doses of corticosteroids is sometimes used to try and ameliorate this pro-inflammatory response. However, the clinical benefits and harms of this type of intervention in the pediatric patient remains unclear.

Objectives

To systematically review the beneficial and harmful effects of the prophylactic administration of corticosteroids, compared with placebo, in pediatric open heart surgery.

Search methods

The trials registry of the Cochrane Heart Group, the Cochrane Central Register of Controlled Trials (CENTRAL) in *The Cochrane Library* (Issue 4, 2006), MEDLINE (1966 to January 2007), EMBASE (1980 to January 2007) were searched. An additional handsearch of the EMRO database for Arabic literature was performed. Grey literature was searched and experts in the field were contacted for any unpublished material. No language restrictions were applied.

Selection criteria

All randomized and quasi-randomized controlled trials of open heart surgery in the pediatric population that received corticosteroids pre-, peri- or post-operatively, with reported clinical outcomes in terms of morbidity and mortality.

Data collection and analysis

Eligible studies were abstracted and evaluated by two independent reviewers. All meta-analyses were completed using RevMan4.2.8. Weighted mean difference (WMD) was the primary summary statistic with data pooled using a random-effects model.

Main results

All cause mortality could not be assessed as the data reports were incomplete. There was weak evidence in favor of prophylactic corticosteroid administration for reducing intensive care unit stay, peak core temperature and duration of ventilation [WMD (95% CI) -0.50 hours (-1.41 to 0.41); -0.20°C (-1.16 to 0.77) and -0.63 hours (-4.02 to 2.75), respectively].

Authors' conclusions

The use of prophylactic steroids in pediatric patients to reduce postoperative complications commonly experienced following cardiopulmonary bypass surgery is not supported by the existing evidence. Further well designed and adequately powered randomized controlled trials are needed to more accurately estimate the benefit and harm of this intervention.

PLAIN LANGUAGE SUMMARY**Prophylactic steroids for pediatric open heart surgery**

After open heart surgery in children complications can occur such as rapid heart rate, breathlessness, low blood pressure, poor circulation, fever, and reduced urine output. These complications are caused by disturbances to the body's metabolism which, in turn, may be due to an immune reaction made by the body's defence systems in response to the surgery. These complications can be life-threatening if left untreated. Corticosteroids are anti-inflammatory drugs that are sometimes used to treat this immune response. However the clinical benefits and harms of corticosteroids in open heart surgery remain unclear. The objective of this study was to review systematically the existing research to determine the effects of corticosteroids in these circumstances. All trials where patients received corticosteroids before, during or after operation were considered. Of the trials found, only four involving 127 children were eligible for inclusion. Unfortunately the most important outcome, death, could not be assessed because of incomplete reports. There was only weak evidence in favor of the use of corticosteroids, with duration of ventilation and stay in intensive care being reduced by about half a day compared with control groups. Due to the poor quality of the trials, the use of corticosteroids to reduce the inflammatory response following surgery is of uncertain benefit.