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[Intervention Review]

# Intraventricular streptokinase after intraventricular hemorrhage in newborn infants

Andrew Whitelaw[1], David Odd[2], Luc P Brion[3], C R Kennedy[4]

[1]Neonatal Intensive Care Unit, University of Bristol, Bristol, UK. [2]Neonatal Medicine, University of Bristol Medical School, Bristol, UK. [3]Division of Neonatal-Perinatal Medicine, University of Texas Southwestern at Dallas, Dallas, Texas, USA. [4]Department of Child Health, Southampton General Hospital, Southampton, UK

**Contact address:** Andrew Whitelaw, Neonatal Intensive Care Unit, University of Bristol, Southmead Hospital, Bristol, BS10 5NB, UK. andrew.whitelaw@bristol.ac.uk.

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## ABSTRACT

### Background

Hydrocephalus following intraventricular hemorrhage (IVH) is still one of the most serious complications of premature birth. Ventriculoperitoneal shunt surgery cannot be carried out early and permanent dependence on a shunt is associated with several serious complications. Streptokinase could be useful in the treatment of post-hemorrhagic hydrocephalus. This form of therapy is based on the hypothesis that multiple blood clots in the cerebrospinal fluid (CSF) are the initial cause of post-hemorrhagic ventricular dilatation and lysis of clots could reopen the pathways of circulation and re-absorption of CSF.

### Objectives

To determine the effect of intraventricular streptokinase after intraventricular hemorrhage on the risk of permanent shunt dependence, neurodevelopmental disability or death in neonates at risk for, or actually developing post-hemorrhagic hydrocephalus (PHH).

### Search methods

Pediatric, Neurosurgical and General Medical Journals were handsearched from 1976 until October 2000, as well as the MEDLINE database (via PubMed) and the Cochrane Central Register of Controlled Trials (CENTRAL, The Cochrane Library) up to April 2007. Personal contacts were used.

### Selection criteria

Randomized controlled trials and quasi-randomized controlled trials evaluating the use of injection of streptokinase into the CSF in infants having or at risk for post-hemorrhagic hydrocephalus.

### Data collection and analysis

Details of patient selection, patient allocation and the interventions were extracted. The end-points examined were: ventriculoperitoneal shunt, death, meningitis, and secondary hemorrhage.

### Main results

Two randomized trials evaluated intraventricular streptokinase in infants developing post-hemorrhagic ventricular dilatation were identified When intraventricular streptokinase was compared with conservative management of post-hemorrhagic ventricular dilatation, the numbers of deaths and babies with shunt dependence were similar in both groups.

No information on the effect of intraventricular streptokinase on disability is available. There is cause for concern about meningitis and secondary intraventricular hemorrhage, but numbers are insufficient to quantify the risks.

**Authors' conclusions**

Intraventricular fibrinolytic therapy with streptokinase, given when post-hemorrhagic ventricular dilatation is established, cannot be recommended for neonates following IVH. A conservative approach with CSF drainage applied only to symptomatic raised intracranial pressure seems appropriate.

## PLAIN LANGUAGE SUMMARY

**Intraventricular streptokinase after intraventricular hemorrhage in newborn infants**

There is no evidence of benefit from giving streptokinase to newborn babies after brain haemorrhage.Bleeding (hemorrhage) into the ventricles of the brain is a serious complication of premature birth and large hemorrhages often lead to hydrocephalus, the process by which fluid accumulates under pressure inside the brain, expanding the head excessively and damaging the brain tissue. The insertion of a valve and drainage system (ventriculoperitoneal shunt) is fraught with problems in this patient group and alternatives to this therapy are needed. A possible approach is to try to dissolve the blood clots initially blocking the reabsorption of fluid in the brain. Streptokinase is a "clot-busting" agent that has been successfully used to unblock coronary arteries. The review found no good evidence that intraventricular injection of streptokinase to infants with large intraventricular hemorrhage or post-hemorrhagic ventricular enlargement reduces the need for ventriculoperitoneal shunt or improves outcome.