

Glycerol for Acute Stroke

Enrico Righetti, MD; Maria Grazia Celani, MD; Teresa Anna Cantisani, MD; Roberto Sterzi, MD
Gudrun Boysen, MD; Stefano Ricci, MD

Background

Brain edema is a major cause of early death after stroke, but no treatment has been shown to be effective, and recommendations in American and European guidelines are based only on expert opinion. A 10% solution of glycerol is a hyperosmolar agent that is claimed to reduce brain edema, and its use has been (and probably still is) rather popular in some countries (Italy, Poland, China).

Objectives

The objectives of this study were to determine whether intravenous glycerol treatment in acute stroke, either ischemic or hemorrhagic, influences death rates and functional outcome in the short-term or long-term, and whether the treatment is safe.

Search Strategy

The Cochrane Stroke Group trials register was searched (January 2003). Some trialists were personally contacted.

Selection Criteria

All completed, randomized and quasi-randomized, controlled, published, and unpublished comparisons evaluating

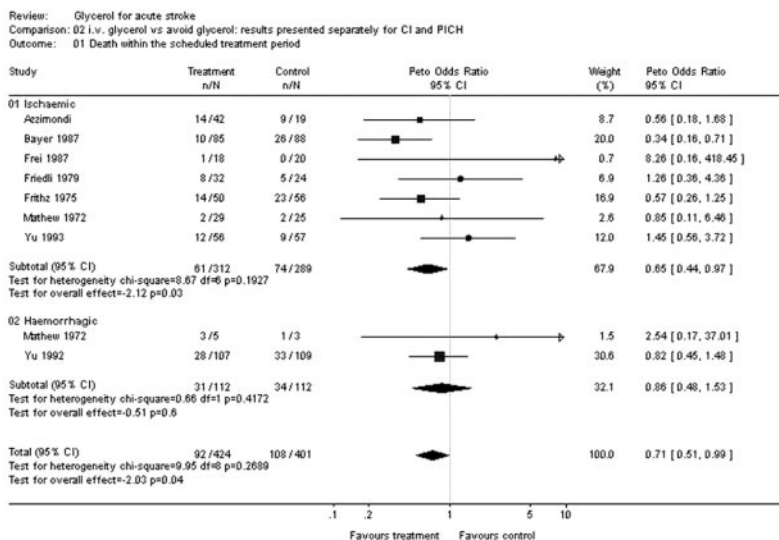
clinical outcome in which intravenous glycerol treatment was initiated within the first days after stroke onset were used.

Data Collection and Analysis

Two reviewers independently applied the inclusion criteria, assessed the trial quality, and extracted data, and the data were checked with all co-reviewers. Death from all causes, functional outcome, and adverse effects were analyzed.

Main Results

Eleven completed randomized trials comparing intravenous glycerol and control treatments were considered. Analysis of death during the scheduled treatment period for acute ischemic and/or hemorrhagic stroke was possible in 10 trials in which 482 glycerol-treated patients were compared with 463 control patients. Glycerol was associated with a nonsignificant reduction in the odds of death within the scheduled treatment period (odds ratio [OR], 0.78; 95% confidence interval [CI], 0.58 to 1.06). Among patients with definite or probable ischemic stroke, glycerol was associated with a significant reduction in the odds of death during the scheduled treatment period (OR, 0.65; 95% CI, 0.44 to 0.97) (Figure). However, at the end of the scheduled follow-up



IV glycerol vs avoid glycerol: results presented for CI and PICH. Death within the scheduled treatment period.

Received April 22, 2004; accepted April 26, 2004.

From the Stroke Service (E.R., M.G.C., S.R.), USL 2 Perugia, Italy; Neurofisiopatologia (T.A.C.), Ospedale Silvestrini, Perugia, Italy; Divisione Neurologia (R.S.), A.O.S. Anna, Como, Italy; Department of Neurology (G.B.), Bispebjerg Hospital, Copenhagen, Denmark.

Correspondence to Enrico Righetti, Stroke Service, USL 2 Via Cestellini, 06087 Ponte San Giovanni, Perugia, Italy. E-mail ititaly@unipg.it (*Stroke*. 2004;36:171-172.)

© 2004 American Heart Association, Inc.

Stroke is available at <http://www.strokeaha.org>

DOI: 10.1161/01.STR.0000149614.84492.29

period, there was no significant difference in the odds of death (OR, 0.98; 95% CI, 0.73 to 1.31). Functional outcome was reported in only 2 studies, but there were nonsignificantly more patients who had a good outcome at the end of scheduled follow-up (OR, 0.73; 95% CI, 0.37 to 1.42). Hemolysis seems to be the only relevant adverse effect of glycerol treatment.

Conclusions

This systematic review suggests a favorable effect of glycerol treatment on short-term survival in patients with probable or definite ischemic stroke, but the confidence intervals were wide and the magnitude of the treatment effect may be only minimal. Because of the relatively small number of patients, and because some trials were performed in the era before computed tomog-

raphy, the results must be interpreted cautiously. The lack of evidence of benefit in long-term survival does not support the routine or selective use of glycerol treatment in patients with acute stroke. However, this inexpensive and safe treatment should be tested in a large-scale randomized trial, perhaps restricted to patients who have clinical evidence of cerebral edema, in which the long-term effects of glycerol treatment on disability and handicap are reliably assessed.

Note: The full reference of this review is available in the Cochrane Library (for subscribers: www.update-software.com/Cochrane). The full article should be cited as: Righetti E, Celani MG, Cantisani T, Sterzi R, Boysen G, Ricci S. Glycerol for acute stroke (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Cichester, UK: Update Software. 227 Cochrane Library, John Wiley and Sons Ltd.

Glycerol for Acute Stroke

Enrico Righetti, Maria Grazia Celani, Teresa Anna Cantisani, Roberto Sterzi, Gudrun Boysen and Stefano Ricci

Stroke. 2005;36:171-172; originally published online November 18, 2004;

doi: 10.1161/01.STR.0000149614.84492.29

Stroke is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Copyright © 2004 American Heart Association, Inc. All rights reserved.

Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://stroke.ahajournals.org/content/36/1/171>

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in *Stroke* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the [Permissions and Rights Question and Answer](#) document.

Reprints: Information about reprints can be found online at:
<http://www.lww.com/reprints>

Subscriptions: Information about subscribing to *Stroke* is online at:
<http://stroke.ahajournals.org/subscriptions/>