

Title: Heparin vs. Normal Saline

Date: April 12, 2007

Research question:

What is the clinical effectiveness of heparin in normal saline compared to normal saline in adult critical care patients for maintaining patency of arterial lines and prevention of thrombus formation or clotting?

Methods:

A limited literature search was conducted on key health technology assessment resources, including PubMed, The Cochrane Library (Issue 1, 2007), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI's HTAIS, EuroScan, international HTA agencies, and a focused Internet search. Results include articles published between 1997 and the present, and are limited to English language publications only. Abstracts and Internet links are provided, where available.

Results:

Health technology assessments:

None found

Systematic reviews and meta-analyses:

1. Randolph AG, Cook DJ, Gonzales CA, Andrew M. Benefit of heparin in peripheral venous and arterial catheters: systematic review and meta-analysis of randomised controlled trials. *BMJ* 1998;316(7136):969-75. [PubMed: PM9550955](#)

CRD Structured abstract:

<http://www.crd.york.ac.uk/CRDWeb/ShowRecord.asp?View=Full&ID=11998008458>

Disclaimer: The Health Technology Inquiry Service (HTIS) is an information service for those involved in planning and providing health care in Canada. HTIS responses are based on a limited literature search and are not comprehensive, systematic reviews. The intent is to provide a list of sources of the best evidence on the topic that CADTH could identify using all reasonable efforts within the time allowed. HTIS responses should be considered along with other types of information and health care considerations. The information included in this response is not intended to replace professional medical advice, nor should it be construed as a recommendation for or against the use of a particular health technology. Readers are also cautioned that a lack of good quality evidence does not necessarily mean a lack of effectiveness particularly in the case of new and emerging health technologies, for which little information can be found, but which may in future prove to be effective. While CADTH has taken care in the preparation of the report to ensure that its contents are accurate, complete and up to date, CADTH does not make any guarantee to that effect. CADTH is not liable for any loss or damages resulting from use of the information in the report.

Copyright: This report contains CADTH copyright material and may contain material in which a third party owns copyright. **This report may be used for the purposes of research or private study only.** It may not be copied, posted on a web site, redistributed by email or stored on an electronic system without the prior written permission of CADTH or applicable copyright owner.

Links: This report may contain links to other information available on the websites of third parties on the Internet. CADTH does not have control over the content of such sites. Use of third party sites is governed by the owners' own terms and conditions.

General guidelines and recommendations:

1. *BCSH guidelines on the insertion and management of central venous access devices*. London: British Committee for Standards in Haematology (BCSH); 2006. Available: http://www.bcshguidelines.com/pdf/BCSH_310806.pdf. (accessed 2007 April 10)

Note: See section on Long-term catheter care starting on page 10

2. ASHP therapeutic position statement on the institutional use of 0.9% sodium chloride injection to maintain patency of peripheral indwelling intermittent infusion devices. *Am J Health Syst Pharm* 2006;63(13):1273-5. http://www.ashp.org/s_ashp/bin.asp?CID=516&DID=5475&DOC=FILE.PDF (accessed 2007 April 10).

RCTs:

1. Whitta RK, Hall KF, Bennetts TM, Welman L, Rawlins P. Comparison of normal or heparinised saline flushing on function of arterial lines. *Crit Care Resusc* 2006;8(3):205-8. [PubMed: PM16930104](#)
2. Abdelkefi A, Ben OT, Kammoun L, Chelli M, Romdhane NB, Kriaa A, et al. Prevention of central venous line-related thrombosis by continuous infusion of low-dose unfractionated heparin, in patients with haemato-oncological disease. A randomized controlled trial. *Thromb Haemost* 2004;92(3):654-61. [PubMed: PM15351864](#)
3. Kaneko Y, Iwano M, Yoshida H, Kosuge M, Ito S, Narita I, et al. Natural saline-flush is sufficient to maintain patency of immobilized-urokinase double-lumen catheter used to provide temporary blood access for hemodialysis. *Blood Purif* 2004;22(5):473-9. [PubMed: PM15523172](#)
4. Rabe C, Gramann T, Sons X, Berna M, Gonzalez-Carmona MA, Klehr HU, et al. Keeping central venous lines open: a prospective comparison of heparin, vitamin C and sodium chloride sealing solutions in medical patients. *Intensive Care Med* 2002;28(8):1172-6. [PubMed: PM12185445](#)

Other studies:

1. Thamlikitkul V, Indranoi A. Switching from heparinized saline flush to normal saline flush for maintaining peripheral venous catheter patency. *Int J Qual Health Care* 2006;18(3):183-5. [PubMed: PM16766602](#)

Prepared by:

Kristen Moulton, B.A., Research Assistant
Melissa Severn, MSt, Information Specialist
Health Technology Inquiry Service
Email: htis@cadth.ca
Tel: 1-866-898-8439

Appendix – Further information

Review articles:

1. Lapum JL. Patency of arterial catheters with heparinized solutions versus non-heparinized solutions: a review of the literature. *Can J Cardiovasc Nurs* 2006;16(2):64-70. [PubMed: PM17153134](#)

Clinical studies:

1. Moser D, Rasse M, Schopper C, Lagogiannis G, Frass M, Ewers R, et al. A scanning electron microscopic study on thrombogenicity of intraarterial catheters for chemotherapeutic treatment in head and neck cancer. *Head Neck* 2002;24(6):566-74. [PubMed: PM12112554](#)
2. Koenigsberg RA, Wysoki M, Weiss J, Faro SH, Tsai FY. Risk of clot formation in femoral arterial sheaths maintained overnight for neuroangiographic procedures. *AJNR Am J Neuroradiol* 1999;20(2):297-9. [PubMed: PM10094358](#)

Additional references:

1. U.S. Food and Drug Administration. Hep-Lock U/P preservative free (Heparin Lock Flush Solution, USP). In: *MedWatch* [database online]. Rockville (MD): FDA; 2006. Available: http://www.fda.gov/medwatch/safety/2006/Oct_PIs/Hep-Lock_PreservativeFree_PI.pdf (accessed 2007 April 10).
2. Cabrero J, Orts MI, Lopez-Coig ML, Velasco ML, Richart M. Variability in the clinical practice of maintaining the patency of peripheral intravenous catheters. *Gac Sanit* 2005;19(4):287-93. [PubMed: PM16050964](#)
3. Myrianthefs P, Sifaki M, Samara I, Baltopoulos G. The epidemiology of peripheral vein complications: evaluation of the efficiency of differing methods for the maintenance of catheter patency and thrombophlebitis prevention. *J Eval Clin Pract* 2005;11(1):85-9. [PubMed: PM15660542](#)
4. Niesen KM, Harris DY, Parkin LS, Henn LT. The effects of heparin versus normal saline for maintenance of peripheral intravenous locks in pregnant women. *J Obstet Gynecol Neonatal Nurs* 2003;32(4):503-8. [PubMed: PM12903700](#)