

Abstracts

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Chlorhexidine-Alcohol Versus Povidone-Iodine for Surgical-Site Antisepsis
Darouiche RO, Wall MJ Jr, Itani KMF, et al. *N Engl J Med* 2010;362:18-26.

Conclusion: For clean-contaminated surgery, cleansing of the patient's skin with chlorhexidine-alcohol reduces surgical-site infections compared with cleansing with povidone-iodine.

Summary: There are 27 million operative procedures performed annually in the United States (*Infect Control Hosp Epidemiol* 1999;20:250-78). Surgical-site infections occur in 300,000-500,000 patients in the United States each year (*J Am Coll Surg* 2008;206:814-9; *JAMA* 2005;294:2035-42). There are recommendations by the Centers for Disease Control and Prevention (CDC) to use 2% chlorhexidine preparations for preoperative cleansing of sites for insertion of vascular catheters, but no CDC recommendations have been put forth regarding antiseptics to prevent surgical-site infection in surgical procedures.

This study compared the efficacy of povidone-iodine and chlorhexidine-alcohol in preventing surgical-site infections in patients with clean-contaminated operations in six university-affiliated hospitals. Patients were randomly assigned to preoperative skin preparation with chlorhexidine-alcohol scrub or povidone-iodine scrub and paint. Surgical-site infection ≤ 30 days was the primary outcome. Secondary outcomes included individual types of surgical-site infection.

There were 849 patients (440 in the povidone-iodine group and 409 in the chlorhexidine-alcohol group) that qualified for intention to treat analysis. Surgical-site infection rates were lower in the chlorhexidine-alcohol group than the povidone-iodine group (9.5% vs 16.1%; relative risk, 0.59; 95% confidence interval, 0.41-0.85; $P = .004$). With regard to secondary end points, chlorhexidine-alcohol was more protective against surgical-site infections than povidone-iodine for superficial incisional infections (4.2% vs 8.6%, $P = .008$) and deep incisional infections (1% vs 3%, $P = .05$). There was no difference in protection against organ-space infections 4.4% vs 4.5%. There were 813 patients who were in the study for 30 days and were subject to a per protocol analysis. Overall results remain similar. No differences were noted in adverse events in the two study groups.

Comment: In the accompanying editorial to this article, Dr Richard Wenzel makes the observation that human beings have approximately 10^{13} total cells, with a total number of colonizing microbes per human being of 10^{14} . Basically, bacteria have a 10:1 numerical advantage! The study indicates that all infections at a specific anatomic site can be reduced with a relatively inexpensive process. By substituting chlorhexidine-alcohol for povidone-iodine, all we need to treat are 17 surgical patients with clean-contaminated wounds to prevent 1 surgical-site infection. Of course, vascular surgical procedures fall primarily into the clean-wound category rather than clean-contaminated, as studied here. Nevertheless, the weight of the available literature with respect to chlorhexidine-alcohol vs povidone-iodine for surgical-site antisepsis clearly indicates that chlorhexidine-alcohol is the preferred agent.

Duration and Magnitude of the Postoperative Risk of Venous Thromboembolism in Middle Aged Women: Prospective Cohort Study

Sweetland S, Green J, Liu B; The Million Women Study collaborators. *BMJ* 2009;339:b4583.

Conclusion: Risk of venous thromboembolism (VTE) is substantially increased in the first 12 postoperative weeks. This varies considerably with type of surgery.

Summary: Scotland and England have central databases of National Health Service (NHS)-funded hospital admissions. Individually linked data are available since 1981 in Scotland and since 1997 in England. The Million Women's Study is a population-based prospective study that recruited 1.3 million women (mean age, 56 years) through the NHS breast-screening program from 1996 to 2001. Participants in the Million Women's Study are electronically linked to inpatient and day case NHS hospital admissions. The data can be used to track hospital admissions and outpatient surgery and follow-up selective complications. In this report, women who had an inpatient or day case hospital admission for a surgical procedure were monitored for any subsequent diagnosis of pulmonary embolism or deep vein thrombosis as reflected in a second inpatient or day case hospital admission or as an underlying cause of death. There were 947,454 women recruited between 1996 and 2001. During follow-up, there were 239,614 admissions for surgery; 5419 were admitted for VTE, and 270 died from VTE.

Women undergoing surgery were 70 times more likely to be admitted with VTE in the first 6 weeks after an inpatient operation (relative risk [RR], 69.1; 95% confidence interval [CI], 63.1-75.6) and 10 times more likely to be admitted for VTE after a day case operation (RR, 9.6; 95% CI, 8.0-11.5). From 7 to 12 weeks after surgery, RR was 19.6 (95% CI, 16.6-23.1) for a

VTE admission after an inpatient procedure. The RR was 5.5 (95% CI, 4.3-7.0) for admission for VTE after an outpatient procedure. There were 2487 admissions for pulmonary embolism and 3529 admissions for deep venous thrombosis. Risk patterns were no different for these two diagnoses. The greatest risk for admission for VTE occurred 1 to 6 weeks after surgery in patients undergoing hip or knee replacement (RR, 220.6; 95% CI, 187.8-259.2) or operations for cancer (RR, 91.6; 95% CI, 73.9-113.4).

Comment: This study indicates that the risk of postoperative VTE peaks at about 3 weeks, but VTE risk is still substantial for 12 weeks postoperatively. It is not surprising that risks are greatest after inpatient surgery, but the risk after outpatient surgery was also impressive. The patients in this study were all middle-aged women, but it seems extended prophylaxes should be considered after many different types of operations in patients with one or more risk factors for VTE.

Growth Rates of Small Abdominal Aortic Aneurysms Correlate with Clinical Events

Thompson AR, Cooper JA, Ashton HA, et al. *Br J Surg* 2010;97:37-44.

Conclusions: There is a bimodal growth pattern of abdominal aortic aneurysms (AAAs). AAA-related events are associated with growth rates of at least 2 mm annually.

Summary: It is well known there is variation in AAA growth rate, indicating that AAA expansion does not conform to simple mechanics of Laplace's Law. In the United Kingdom Small Aneurysm Trial, growth of AAAs ranged from -1.0 to 6.1 mm/y (*Circulation* 2004;110:16-21). Peripheral arterial disease and diabetes are known to be associated with slowed AAA growth and smoking with more rapid growth. Elastin peptide, a serum biomarker, appears to be associated with AAA expansion (*Eur J Vasc Endovasc Surg* 2008;36:273-80). Expansion associations with hypercholesterolemia, sex, and hypertension are less clear, whereas doxycycline, statins, and angiotensin-converting enzyme inhibitors may slow AAA growth.

Some have demonstrated an association between increased AAA growth and rupture (*J Vasc Surg* 2003;37:280-4), whereas others have been unable to demonstrate such a relationship (*J Vasc Surg* 2002;35:666-71). In this report, the authors examine patterns of AAA growth and the relationship between aneurysm growth and specific risk factors (mean arterial pressure, history of hypertension, hypercholesterolemia, diabetes, smoking, ischemic heart disease, and sex) and aneurysm-related events (surgery or death).

From 1984 to 2007, data for 1649 individuals with AAAs were collected prospectively in the Chichester AAA screening program. Data included serial aortic size measurements, blood pressure, risk factors for arterial disease, and medications. The authors adjusted growth rates for risk factor confounders using flexible hierarchical modeling. AAA growth distribution was analyzed using Silverman's test of multimodality. There were 1231 individuals with more than one scan over a surveillance interval of at least 3 months. AAAs demonstrated a bimodal growth pattern, with nearly 50% of all AAAs never progressing to surgery or rupture. Adjusted AAA growth rates > 2 mm annually predicted AAA related events (surgery or death).

Comment: Many believe the natural history of AAAs is inevitable progressive dilatation until rupture occurs or the patient dies from other causes. The data, however, indicate only 27.2% of monitored AAAs end up requiring repair, and patterns of expansion may relate to clinical events. This information, along with more sophisticated models of stress points on the AAA wall, may eventually allow better selection of patients for AAA repair. Perhaps someday there will be a cohort of patients, even with relatively large AAAs, that can be safely observed. Such knowledge would result in increased peace of mind for the patient and the physician as well as savings for the health care system.

Median Arcuate Ligament Syndrome: Vascular Surgical Therapy and Follow-up of 18 Patients

Grottemeyer D, Duran M, Iskandar F, et al. *Lagenbecks Arch Surg* 2009;394:1085-92.

Conclusion: Open surgical therapy is safe and reliable for treatment of median arcuate ligament syndrome.

Summary: Fixed stenosis and intermittent compression of the celiac artery are both common. Median arcuate ligament syndrome is characterized by a combination of extrinsic compression of the celiac artery from median arcuate ligament fibrous bands or ganglionic periaortic tissue, or both, in combination with abdominal pain, nausea, vomiting, and nonintentional weight loss. It is an infrequent diagnosis. The incidence of median arcuate ligament syndrome is estimated at 2 per 100,000 patients and is said