Scanning the Literature

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How Dangerous Are TIAs and for Whom?

Johnston SC, Gress DR, Browner WS, et al. Short-term prognosis after emergency department diagnosis of TIA. JAMA 2000; 284:2901-2906.

Context: Management of patients with acute transient ischemic attack (TIA) varies widely, with some institutions admitting all patients and others proceeding with outpatient evaluations. Defining the short-term prognosis and risk factors for stroke after TIA may provide guidance in determining which patients need rapid evaluation. Objective: To determine the short-term risk of stroke and other adverse events after emergency department (ED) diagnosis of TIA. Design and **Setting:** Cohort study conducted from March 1997 through February 1998 in 16 hospitals in a health maintenance organization in northern California. Patients: A total of 1707 patients (mean age, 72 years) identified by ED physicians as having presented with TIA. Main Outcome Measures: Risk of stroke during the 90 days after index TIA; other events, including death, recurrent TIA, and hospitalization for cardiovascular events. Results: During the 90 days after index TIA, 180 patients (10.5%) returned to the ED with a stroke, 91 of which occurred in the first 2 days. Five factors were independently associated with stroke: age greater than 60 years (odds ratio [OR], 1.8; 95% confidence interval [CI], 1.1-2.7; P=.01), diabetes mellitus (OR, 2.0; 95% CI, 1.4-2.9; P<.001), symptom duration longer than 10 minutes (OR, 2.3; 95% CI, 1.3-4.2; P=.005), weakness (OR, 1.9; 95% CI, 1.4-2.6; P<.001), and speech impairment (OR, 1.5; 95% CI, 1.1-2.1; P=.01). Stroke or other adverse events occurred in 428 patients (25.1%) in the 90 days after the TIA and included 44 hospitalizations for cardiovascular events (2.6%), 45 deaths (2.6%), and 216 recurrent TIAs (12.7%). Conclusions: Our results indicate that the short-term risk of stroke and other adverse events among patients who present to an ED with a TIA is substantial. Characteristics of the patient and the TIA may be useful for identifying patients who may benefit from expeditious evaluation and treatment.

Comments: This cohort study involved over 1700 patients managed by primary Care Physicians after a first diagnosis of TIA in the emergency room. The mean age of patients was 72 years and they were followed for 90 days post-TIA diagnosis. Less than 2% of patients were hospitalized, and diagnostic testing was ordered in less than 25% of patients; however, 10.5% of patients suffered a stroke in the 90 days post-TIA follow-up, more than half occurring within the first 2 days after the initial TIA episode. Stroke risk was more than 50 times greater than would be expected in a similarly aged population following diagnosis of TIA. In addition to stroke, other adverse effects included recurrent TIA in 12.7% and hospitalization for a cardiovascular event. Although the study did not address efficacy of TIA therapies, it suggested that urgent intervention may he warranted after a TIA since more than 50% of adverse outcomes took place within the first 4 days after the diagnosis.

Drugs to Avoid During Pregnancy, or at Least Give With Folic Acid

Hernandez-Diaz S, Werler MM, Walker AM, et al. Folic acid antagonists during pregnancy and the risk of birth defects. N Engl J Med 2000; 343:1608-1614.

Background: Multivitamin supplementation in pregnant women may reduce the risks of cardiovascular defects, oral clefts, and urinary tract defects in their infants. We evaluated whether the folic acid component of multivitamins is responsible for the reduction in risk by examining the associations between maternal use of folic acid antagonists and these congenital malformations. **Methods:** We assessed exposure to folic acid antagonists that act as dihydrofolate reductase inhibitors and to certain antiepileptic drugs in 3870 infants with cardiovascular defects, 1962 infants with oral clefts, and 1100 infants with urinary tract defects and also in 8387 control infants with malformations the risk of which is

not reduced after vitamin supplementation. Mothers were interviewed within six months after delivery about their medication use during pregnancy. **Results:** The relative risks of cardiovascular defects and oral clefts in infants whose mothers were exposed to dihydrofolate reductase inhibitors during the second or third month after the last menstrual period, as compared with infants whose mothers had no such exposure, were 3.4 (95 percent confidence interval, 1.8 to 6.4) and 2.6 (95 percent confidence interval, 1.1 to 6.1), respectively. The relative risks of cardiovascular defects, oral clefts, and urinary tract defects after maternal exposure to antiepileptic drugs were 2.2 (95 percent confidence interval, 1.4 to 3.5), 2.5 (95 percent confidence interval, 1.5 to 4.2), and 2.5 (95 percent confidence interval, 1.2 to 5.0), respectively. Use of multivitamin supplements containing folic acid diminished the adverse effects of dihydrofolate reductase inhibitors, but not that of antiepileptic drugs. **Conclusions:** Folic acid antagonists, which include such common drugs as trimethoprim, triamterene, carbamazepine, phenytoin, phenobarbital, and primidone, may increase the risk not only of neural-tube defects, but also of cardiovascular defects, oral clefts, and urinary tract defects. The folic acid component of multivitamins may

Comments: Folic acid use during pregnancy decreases risk of neural tube defects in infants, but it is not clear whether it may also reduce risk of other congenital malformations. This study investigates the effect of folic acid in early pregnancy by studying whether maternal use of folic acid antagonists would increase the incidence of birth defects. The authors evaluated close to 7000 infants with cardiovascular defects, urinary defects, or oral clefts. The maternal exposure included folic acid antagonists such as trimethoprim, triamterene, carbmazepine, phenytoin, phenobarbital, and primidone. Maternal ingestion of dihydrofolate reductase inhibitors had a relative risk of 3.4 for producing cardiovascular defects in infants and a 2.6 relative risk of oral clefts. Maternal use of multivitamins containing folic acid appeared to reduce the adverse effects of these medications.

We Can Reduce Colon Cancer by Stool Card Screening

Mandel JS, Church TR, Bond JH, et al. The effect of fecal occult-blood screening on the incidence of colorectal cancer. N Engl J Med 2000; 343:1603-1607.

Background: Both annual testing for fecal occult blood and biennial testing significantly reduce mortality from colorectal cancer. However, the effect of screening on the incidence of colorectal cancer remains uncertain, despite the diagnosis and removal of precancerous lesions in many persons who undergo screening. **Methods:** We have followed the participants in the Minnesota Colon Cancer Control Study for 18 years. A total of 46,551 people, most of whom were 50 to 80 years old, were enrolled between 1975 and 1978 and randomly assigned to annual screening, biennial screening, or usual care (the control group). Those assigned to the screening groups were asked to prepare and submit two samples from each of three consecutive stools for guaiac-based testing. Those with at least one positive slide in the set of six were offered a diagnostic examination that included colonoscopy. Screening was conducted between 1976 and 1982 and again between 1986 and 1992. Study participants have been followed with respect to newly diagnosed cases of colorectal cancer and deaths. Follow-up has been more than 90 percent complete. **Results:** During the 18-year follow-up period, we identified 1359 new cases of colorectal cancer: 417 in the annual-screening group, 435 in the biennial-screening group, and 507 in the control group. The cumulative incidence ratios for colorectal cancer in the screening groups as compared with the control group were 0.80 (95 percent confidence interval, 0.70 to 0.90) and 0.83 (95 percent confidence interval, 0.73 to 0.94) for the annual-screening and biennial-screening groups, respectively. For both screening groups, the number of positive slides was associated with the positive predictive value both for colorectal cancer and for adenomatous polyps at least 1 cm in diameter. **Conclusions:** The use of either annual or biennial fecal occult-blood testing significantly reduces the incidence of colorectal cancer.

Comments: The Minnesota Colon Cancer Control Study, over a period of 18 years, included use of either annual or biannual fecal occult-blood testing and looked at their relationship to the incidence of colorectal cancer. The study included more than 46,000 people between 50 and 80 years old. They were randomly assigned to one of three groups: annual screening, biannual screening, or usual care. Individuals with one or more positive slides in a set of six were further evaluated with colonoscopy.

The rates of compliance with screening were 75% in the annual group and 78% in the biannual group. During the 18-year study, 1359 new cases of colorectal cancer were detected, 417 cancer cases in the annual group, 435 in the biannual group, and 507 in the usual care group. The incidences of colorectal cancer were 0.8 in the annual group, 0.83 in the biannual group, compared with the control group. The number of guaiac-positive slides was associated with the positive predictive value for colorectal cancer and any adenomatous polyp greater than 1 cm in diameter. The authors conclude that reduced colon cancer mortality was due to the sensitivity of fecal occult-blood testing.

Aspirin Increases GI Bleeds by 59% to 68%

Derry S, Loke YK. Risk of gastrointestinal haemorrhage with long term use of aspirin: meta-analysis. BMJ 2000; 321:1183-1187.

Objectives: To assess the incidence of gastrointestinal haemorrhage associated with long term aspirin therapy and to determine the effect of dose reduction and formulation on the incidence of such haemorrhage. **Design:** Meta-analysis of 24 randomised controlled trials (almost 66 000 participants). **Intervention:** Aspirin compared with placebo or no treatment, for a minimum of one year. **Main Outcome Measures:** Incidence of gastrointestinal haemorrhage. **Results:** Gastrointestinal haemorrhage occurred in 2.47% of patients taking aspirin compared with 1.42% taking placebo (odds ratio 1.68; 95% confidence interval 1.51 to 1.88); the number needed to harm was 106 (82 to 140) based on an average of 28 months' therapy. At doses below 163 mg/day, gastrointestinal haemorrhage occurred in 2.30% of patients taking aspirin compared with 1.45% taking placebo (1.59; 1. 40 to 1.81). Meta-regression showed no relation between gastrointestinal haemorrhage and dose. For modified release formulations of aspirin the odds ratio was 1.93 (1.15 to 3.23).

Conclusions: Long term therapy with aspirin is associated with a significant increase in the incidence of gastrointestinal haemorrhage. No evidence exists that reducing the dose or using modified release formulations would reduce the incidence of gastrointestinal haemorrhage.

Comments: This study included a meta-analysis of 24 randomized controlled studies involving over 60,000 participants. In the 24 studies analyzed, daily doses of aspirin ranged from 50 to 1500 mg with a mean treatment duration of 28 months. The indications for aspirin use ranged from primary prevention of cardiovascular disease to prophylaxis after a CVA. GI hemorrhage occurred in 2.47% of participants receiving aspirin compared with 1.42% taking placebo, and the overall incidence of GI hemorrhage was 1 in about 100 individuals taking aspirin during the 28 months. However, it was felt that the benefits in treating stroke and cardiovascular disease far outweigh the risks associated with aspirin use.

16-Year-Olds Who Smoke Have More Anxiety Problems When They Are 22-Year-Olds

Johnson JG, Cohen P, Pine DS, et al. Association between cigarette smoking and anxiety disorders during adolescence and early adulthood. JAMA 2000; 284:2348-2351.

Context: Cigarette smoking is associated with some anxiety disorders, but the direction of the association between smoking and specific anxiety disorders has not been determined. **Objective:** To investigate the longitudinal association between cigarette smoking and anxiety disorders among adolescents and young adults. **Design:** The Children in the Community Study, a prospective longitudinal investigation. **Setting and Participants:** Community-based sample of 688 youths (51% female) from upstate New York interviewed in the years 1985-1986, at a mean age of 16 years, and in the years 1991-1993, at a mean age of 22 years. **Main Outcome Measure:** Participant cigarette smoking and psychiatric disorders in adolescence and early adulthood, measured by age-appropriate versions of the Diagnostic Interview Schedule for Children. **Results:** Heavy cigarette smoking (>/=20 cigarettes/d) during adolescence was associated with higher risk of agoraphobia (10.3% vs 1.8%; odds ratio [OR], 6.79; 95% confidence interval [CI], 1.53-30.17), generalized anxiety disorder (20.5% vs 3.71%; OR, 5.53; 95% CI, 1.84-16.66), and panic disorder (7.7% vs 0.6%; OR, 15.58; 95% CI, 2.31-105.14) during early adulthood after controlling for age, sex, difficult childhood temperament; alcohol and drug use, anxiety, and depressive disorders during adolescence; and parental smoking, educational level, and psychopathology. Anxiety disorders during adolescence were not significantly associated with chronic cigarette smoking during early adulthood. Fourteen percent and 15% of participants with and without anxiety during adolescence, respectively, smoked at least 20 cigarettes per day during early adulthood (OR, 0.88; 95% CI, 0.36-2.14). **Conclusion:** Our results suggest that cigarette smoking may increase risk of certain anxiety disorders during late adolescence and early adulthood.

Comments: This was a first community-based longitudinal study to evaluate association between smoking and specific anxiety disorders in adolescents and young adults. It included close to 700 youths, ages from 14 to 22, the youths being assessed three times during a 10-year study. After controlling for covariates, heavy cigarette smoking (20 or more cigarettes per day) was significantly associated with generalized anxiety disorder (20.5% among smokers vs. 3.71% for nonsmokers), agoraphobia (10.3% in heavy smokers vs. 1.8% in nonsmokers), and panic disorder (8% of smokers vs. 1% in nonsmokers). Conversely, anxiety disorders manifesting during adolescence were not associated with cigarette smoking during early adulthood.

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There Goes Another Perfectly Good Operation

La Perna L, Olin JW, Goines D, et al. Ultrasound-guided thrombin injection for the treatment of postcatheterization pseudoaneurysms. Circulation 2000; 102:2391-2395.

Background: This prospective study was designed to assess the safety and efficacy of using bovine thrombin injection to treat pseudoaneurysms. **Methods and Results:** From April 1998 through December 1999, 70 pseudoaneurysm[s] were injected with bovine thrombin under the guidance of color duplex ultrasound. The most superficial pseudoaneurysm chamber was entered with a 1.5-inch, 19- to 22-gauge or spinal needle. Bovine thrombin, in a 1000 U/cc solution, was injected into the chamber. A total of 36 women and 34 men underwent ultrasound-guided thrombin injection (UGTI). Their mean age was 69.5 years. Most pseudoaneurysms were associated with diagnostic cardiac catheterization or percutaneous coronary intervention (80%). Two pseudoaneurysms arose from the brachial artery; the remainder were in the groin. Twenty-one patients were being treated with either heparin or warfarin, and the majority of the others were on antiplatelet therapy with aspirin or clopidogrel. UGTI was successful in 66 of the 70 patients (94%). The first patient in the series had 2 attempts at thrombin injection and refused further attempts. Two patients had undergone stent graft placement and had short, wide tracts. Both of these patients required surgical repair of their pseudoaneurysms. The fourth patient had a nearly complete pseudoaneurysm thrombosis and was lost to follow-up on discharge. No arterial thrombotic events occurred. One patient had a soleal vein thrombosis in the ipsilateral leg. **Conclusions:** UGTI was safe and effective in 94% of patients with postcatheterization pseudoaneurysms. Anticoagulant use did not hinder successful thrombosis. UGTI should be the initial treatment of choice for patients with postcatheterization pseudoaneurysms.

Comments: The development of arterial pseudoaneurysms following percutaneous cannulation (femoral or brachial) for cardiac catheterization or peripheral vascular interventional procedures is not unusual, albeit relatively uncommon. Femoral pseudoaneurysms may lead to significant hemorrhage, infection, distal embolization, or fistula formation. Direct surgical exposure and repair or ultrasound-guided direct compression of the pseudoaneurysm until thrombosis have been used successfully to treat these lesions in the past and are still employed today. Significant complications associated with the surgical repair of psudoaneurysms include hemorrhage, distal ischemia, wound infection, lymphocoele, and peripheral radiculopathy. Compression has been found to be both labor intensive and uncomfortable for the patient and ultrasonographer, with poorer results compared with surgery. More recently, several recent publications have proposed percutaneous injection of the psuedoaneurysm cavity with thrombin under ultrasound guidance. This article was designed to prospectively evaluate the safety and efficacy of this treatment.

The authors treated 70 patients with postcatheterization pseudoaneurysms (68 femoral, 2 brachial) using percutaneous thrombin injection. These patients were then followed prospectively over 20 months using duplex ultrasonography. The pseudoaneurysm was successfully treated in 94% of these patients, and no major complications were identified that could be attributed to the thrombin injection. While there is a reported incidence of femoral artery thrombosis associated with thrombin injection, it was not demonstrated in this study and is infrequently reported in the literature. Based on this and previous studies, surgical repair of postcatheterization pseudoaneurysms may soon be required only following the rare failure of this less invasive percutaneous technique.

Move Over Coumadin–There's a New Guy in Town

Salartash K, Lepore M, Gonze MD, et al. Treatment of experimentally induced caval thrombosis with oral low molecular weight heparin and delivery agent in a porcine model of deep venous thrombosis. Ann Surg 2000; 231:789-794.

Objective: This experiment evaluated enterally administered low molecular weight heparin (LMWH) combined with sodium N-[10-(2-hydroxybenzoyl)amino] decanoate (SNAD) for the treatment of induced venous thrombosis. **Summary Background Data:** SNAD is a delivery agent that potentiates the gastrointestinal absorption of LMWH. **Methods**: Forty female pigs were equally assigned to four groups: control (saline); enteral LMWH, 2,000 IU/kg; enteral SNAD, 50 mg/kg; and enteral LMWH, 2,000 IU/kg and SNAD, 50 mg/kg. Under fluoroscopic guidance, the infrarenal vena cava was occluded with a balloon catheter. Two milliliters of ethanol was injected into the distal vena cava. The inflated balloon catheter remained in situ for 5 days, at which time animals angiographically exhibiting thrombus were randomly assigned to the four groups. Study medications were dosed at 12-hour intervals by means of a gastrostomy tube placed previously. After 7 days of treatment, thrombus was extracted. A separate group of 10 animals was used to measure plasma antifactor Xa levels for 6 hours after enteral dosing of LMWH/SNAD. **Results:** The amount of residual thrombus after treatment with enteral LMWH/SNAD was significantly decreased. Antifactor Xa levels were significantly elevated in the LMWH/SNAD group versus baseline. **Conclusion:** The combination of enterally administered LMWH and SNAD given for 7 days appeared to decrease caval thrombosis in this model of deep vein thrombosis. Enteral LMWH/SNAD effected an increase in plasma levels of antifactor Xa.

Comments: For decades, the treatment of acute deep venous thrombosis (DVT) has been hospitalization and treatment with intravenous heparin followed by oral coumadin therapy that is continued following discharge for 3-6 months. While this regimen has proven effective for prevention of pulmonary embolism secondary to DVT, it is costly and not without risks. The cost of IV heparin/oral coumadin therapy begins with the inpatient hospitalization, which is variable depending on the length of time required to achieve an adequate and stable prothrombin time (PT), and extends throughout the duration of therapy with periodic laboratory analysis and coumadin dose adjustments. The untoward side effects of coumadin are well documented and range from allergic reactions to devastating intracerebral hemorrhage. More recently, outpatient treatment of DVT with twice daily subcutaneous dosing of low molecular weight heparin (LMWH) followed by oral coumadin has been successfully employed. However, the inherent disadvantages of coumadin therapy are still present in this regimen. This article represents one of the studies that may lead to an oral heparin preparation for the treatment of DVT that would eliminate the need for hospitalization, repeated laboratory analysis, and most importantly, coumadin based therapy.

The molecular structure of heparin precludes adequate intestinal absorption when administered in an oral form. Researchers have attempted to achieve adequate anticoagulation with oral heparin since the early 1960s but to no avail. Recently, a carrier molecule (SNAD) was constructed to bind specifically to LMWH, facilitate its absorption across the intestinal mucosa, and then release the LMWH molecule unchanged. This study utilized an oral SNAD/LMWH preparation to achieve effective anticoagulation in the porcine DVT model as evidenced by significantly decreased residual thrombus weights and elevated markers of anticoagulation in the experimental groups compared with placebo controls. An oral heparin regimen such as this would eliminate the risks of coumadin therapy as well as the costs of inpatient care and ongoing laboratory analysis for 3-6 months. This type of oral heparin therapy may represent an ideal therapy for DVT in the near future being an effective (and cost-effective) alternative to coumadin therapy.

Store-Bought Is Never As Good As Homemade

Passman MA, Marston WA, Carlin RE, et al. Long-term results of infrapopliteal bypass using polytetrafluoroethylene and a Taylor vein patch for critical lower extremity ischemia. Vasc Surg 2000; 34:569-576.

Although distal anastomotic vein patch and cuff techniques have been advocated to improve the patency of lower extremity bypass grafts with polytetrafluoroethylene (PTFE), use of this approach in the infrapopliteal position remains unproven. The purpose of this study is to evaluate the results of infrapopliteal bypass grafting using PTFE and Taylor vein patch for critical lower extremity ischemia. All patients undergoing infrapopliteal bypass grafting with PTFE and Taylor vein patch for ischemic rest pain or tissue loss were identified from the vascular surgery registry. This report describes results for surgical morbidity and mortality, patency, limb salvage, and survival for procedures performed from 1993 through 1998. Forty-two infrapopliteal bypass grafts with PTFE and Taylor vein patch were placed for critical lower extremity ischemia during the 6-year period. Surgical indications were rest pain in 25 (60%) patients and ischemic tissue loss in 17 (40%). Distal artery anastomosis included 17 (40%) anterior tibial, 10 (24%) peroneal, eight (19%) posterior tibial, and seven (17%) tibioperoneal arteries. Follow-up ranged from 1 to 52 months (mean 17 months). Life-table primary patency, secondary patency, limb salvage, and survival at 3 years were 25%, 31%, 44%, and 66%, respectively. Infrapopliteal bypass with PTFE and Taylor vein patch for critical lower extremity ischemia has poor long-term results that are comparable to those reported for PTFE without Taylor vein patch.

Comments: The most prohibitive factor in the surgical treatment of peripheral arterial disease (PAD) is the availability of a useable bypass conduit – i.e. a vein. Most commonly, greater saphenous vein is the material of choice to be fashioned as a bypass around a high-grade stenosis or occlusion of a native artery that is causing pain or loss of tissue. The long-term patency and resistance to infection in peripheral bypasses constructed with vein grafts greatly exceeds that found with alternative materials. The problem lies in the finite amount of vein that exists within each patient. As the patient population increases in age, the number of patients undergoing coronary artery bypass increases accordingly. This procedure also preferentially uses greater saphenous vein to bypass diseased coronary arteries. Therefore, it is common to be confronted with a patient exhibiting critical lower extremity ischemia (i.e. tissue loss or rest pain) and an inadequate amount of vein for the construction of an appropriate bypass to salvage the affected limb. While other less attractive veins potentially may be used as bypass conduit (lesser saphenous, cephalic or basilic arm vein), several centers have attempted lower extremity revascularizations using the synthetic polymer polytetrafluoretylene (PTFE). Most studies have shown that PTFE used for the construction of a bypass from the femoral artery to the popliteal artery above the level of the knee is comparable (at 2-3 years) to the use of autologus vein in patients with good perfusion to the lower portion of the leg. However, the use of PTFE for a bypass that extends below the level of the knee to the tibial vessels has a much worse outcome in terms of patency, infection, and limb salvage. Despite the problems associated with tibial bypass using PTFE, this may represent the only alternative to amputation in certain patients. As a result of this difficult circumstance, investigators have tried various methods to improve the outcome of distal PTFE bypasses. The Taylor patch is a technique that was developed in hopes of decreasing the hyperplastic response at the distal anastamosis of PTFE grafts that often leads to graft failure by placing an intervening cuff of autologus vein between the PTFE graft and the target native artery. Some investigators have published reports suggesting that this technique using an intervening vein patch significantly improves the patency and limb salvage following distal PTFE bypass. However, the effect of this maneuver and the overall wisdom of tibial bypass with PTFE remain unproven and are topics of debate in the vascular literature.

This article describes the experience of the authors using a Taylor patch in combination with a distal PTFE bypass for limb threatening ischemia. The results were not significantly improved compared with commonly reported outcomes of PTFE bypasses without a vein patch, and the findings suggest two key points. First, interposition vein patches likely do not improve outcomes with PTFE bypasses. Second, the patency and limb salvage following any distal bypass constructed with PTFE is extremely poor compared with a vein bypass. The use of a synthetic material as bypass conduit to the distal arteries of the leg should be reserved for a highly select group of patients who meet strict criteria. Candidates for distal bypass with a synthetic material must first have absolute limb threatening ischemia. There is no role for this type of vascular reconstruction for any from of claudication. No source of autologous vein should be left untapped before a synthetic conduit is selected. Finally, patients who are facing amputation and lack suitable vein for bypass must be physiologically fit to withstand the procedure and have an improved quality of life as a result of the salvaged limb.

A New Trick For An Old Dog

Moore WS, Kashyap VS, Vescera CL, et al. Abdominal aortic aneurysm: A 6-year comparison of endovascular versus transabdominal repair. Ann Surg 1999; 230:298-308.

Objective: To test the hypothesis that endovascular repair of abdominal aortic aneurysm (AAA) will result in a significant reduction in mortality and morbidity rates and cost when compared with open transabdominal repair. **Summary Background Data:** Since the introduction of endovascular repair of AAA this decade, multiple groups have evaluated different endovascular grafts. Despite the excellent results reported initially, there has been a paucity of well-controlled, comparative studies looking at long-term outcome. **Methods:** From 1992 to 1998, the first 100 consecutive patients undergoing endovascular AAA repair (mean age 74.7, AAA size 5.6 cm) were compared to 100 patients undergoing transabdominal repair (mean age 72.9, AAA size 5.9 cm). All patients undergoing endovascular repair received a device manufactured by Endovascular Technologies, Inc. (Menlo Park, CA) and were prospectively followed with periodic examination, contrast-enhanced computed tomography, and duplex scanning. Of the 200 patients, 198 have been available for long-term follow-up. **Results:** The two groups had similar preoperative risk factors. Surgical time (211 vs. 256 minutes, $p < 0.005$), blood loss (326 vs. 1010 ml, $p < 0.005$), and blood replacement (0.4 vs. 1.6 units, $p < 0.005$) were all decreased in the endovascular group. Median intensive care unit stay (0 vs. 2 days) and hospital stay (2 vs. 7 days) were significantly reduced in the endovascular group. Insignificant trends in lower morbidity rates (myocardial infarction 1 % vs. 5%, respiratory failure 1 % vs. 5%, colon ischemia 0% vs. 2%) were present in patients undergoing endovascular repair. This led to decreased hospital cost and increased hospital profit. The surgical mortality rate (2% vs. 3%) and 5-year survival rate (65% vs. 72%) have been equivalent between the two groups. **Conclusions**: The surgical mortality rate is low for both groups and not statistically different. Endovascular repair significantly reduces resource utilization (surgical time, blood replacement, intensive care unit and hospital stay) and cost when compared to transabdominal aneurysm repair. Long-term survival is equivalent in patients undergoing AAA repair regardless of technique. Although endovascular repair appears durable for up to 6 years, longer follow-up studies are warranted.

Comments: Since Juan Parodi of Buenos Aries performed the first endovascular repair of an abdominal aortic aneurysm in 1991, the explosion of technological advances in the endovascular field has been unprecedented in Vascular Surgery. Endovascular AAA repair is based on the union of vascular grafts and stent technology, and the original endovascular grafts were straight tube grafts hand sewn onto metallic stents and compressed to a relatively small caliber that could be placed via a femoral catheter. Endovascular grafts have now evolved into a third generation of devices that are modular and bifurcated in design, utilizing a variety of metallic structural supports and fixation techniques within the lumen of the aorta. The endovascular technique utilizes bilateral femoral artery access to deploy the endograft and is often performed under epidural anesthesia.

Despite the resounding enthusiasm for endovascular AAA repair, there are questions regarding the long-term effectiveness of this technique compared with the traditional open AAA repair. This article from Dr. Wesley S. Moore's group at UCLA was designed to determine if endovascular AAA repair would decrease mortality, morbidity, and cost compared with open transabdominal AAA repair. This is one of few prospective, controlled trials comparing endovascular vs. open AAA repair over a significant period. The authors were able to show a significant decrease in surgical time, blood loss, and median intensive care unit stay in the endovascular AAA repair group, but there was no demonstrable difference in surgical mortality or 5-year survival between the two groups.

While endovascular AAA repair has been shown to be a successful alternative to open surgery, it remains in its infancy compared with open AAA repair. Data regarding long-term outcome following endovascular repair are not yet available although mid-term results such as those presented herein are very promising.

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