- 24 **Valencia MJ**, Climent PV, Marin O, *et al*. The efficacy of scheduled cardioversion in atrial fibrillation: comparison of two schemes of treatment: electrical versus pharmacological cardioversion. *Rev Esp Cardiol* 2002;**55**:113–20.
- 25 **Mitchell ARJ**, Chail S, Bordoli G, *et al*. Diazepam or midazolam study for external DC cardioversion (The DORM Study). *Europace* 2003;**5**:391–5.
- 26 **Pugh PJ**, Spurrell P, Kamalvand K, *et al*. Sedation by physician with diazepam for DC cardioversion of atrial arrhythmias. *Heart* 2001;**86**:572–3.
- 27 **Boddhoo I**, Bordoli G, Mitchell AR, *et al*. The safety and effectiveness of a nurse led cardioversion service under sedation. *Heart* 2004;**90**:1443–6.
- 28 **Currie MP**, Karwatowski SP, Perera J, *et al*. Introduction of nurse led DC cardioversion service in day surgery unit: prospective audit. *BMJ* 2004;**329**:892–4.
- 29 **Quinn T**. Early experience of nurse-led elective DC cardioversion. *Nurs Crit Care* 1998;**3**:59–62.
- 30 **Naccarelli GV**, Wolbrette DL, Luck JC. Proarrhythmia. *Medl Clin North Am* 2001;**85**:503–26.
- 31 **Chaudhry GM**, Haffajee CI. Antiarrhythmic agents and proarrhythmia. *Crit Care Med* 2000;**28**(Suppl):N158–64.
- 32 **Podrid PJ**. Proarrhythmia, a serious complication of antiarrhythmic drugs. *Curr Cardiol Rep* 1999;**1**:289–96.
- 33 **Mooss AN**, Wurdeman RL, Mohiuddin SM, *et al*. Esmolol versus diltiazem in the treatment of postoperative atrial fibrillation/atrial flutter after open heart surgery. *Am Heart J* 2000;**140**:176–80.
- 34 **Hilleman DE**, Reyes AP, Mooss AN, *et al*. Esmolol versus diltiazem in atrial fibrillation following coronary artery bypass graft surgery. *Curr Med Res Opin* 2003;**19**:376–82.
- 35 **The Digitalis in Acute Atrial Fibrillation (DAAF) Trial Group**. Intravenous digoxin in acute atrial fibrillation. Results of a randomized, placebo-controlled multicentre trial in 239 patients. *Eur Heart J* 1997;**18**:649–54.
- 36 **Jordaens L**, Trouerbach J, Calle P, *et al*. Conversion of atrial fibrillation to sinus rhythm and rate control by digoxin in comparison to placebo. *Eur Heart J* 1997;**18**(4):643–8.
- 37 **Falk RH**, Knowlton AA, Bernard SA, *et al*. Digoxin for converting recent-onset atrial fibrillation to sinus rhythm. A randomized, double-blinded trial. *Ann Intern Med* 1987;**106**:503–6.
- 38 **Martinez-Marcos FJ**, Garcia-Garmendia JL, Ortega-Carpio A, *et al*. Comparison of intravenous flecainide, propafenone, and amiodarone for conversion of acute atrial fibrillation to sinus rhythm. *Am J Cardiol* 2000;**86**:950–3.
- 39 **Joseph AP**, Ward MR. A prospective, randomized controlled trial comparing the efficacy and safety of sotalol, amiodarone, and digoxin for the reversion of new-onset atrial fibrillation. *Ann Emerg Med* 2000;**36**:1–9.
- 40 **Van Gelder IC**, Tuinenburg AE, Schoonderwoerd BS, *et al*. Pharmacologic versus direct-current electrical cardioversion of atrial flutter and fibrillation. *Am J Cardiol* 1999;**84**:147R–51R.
- 41 **Singh BN**, Singh SN, Reda DJ, *et al*. Amiodarone versus sotalol for atrial fibrillation. *N Engl J Med* 2005;**352**:1861–72.
- 42 **Villani GQ**, Piepoli MF, Terracciano C, *et al*. Effects of diltiazem pretreatment on direct-current cardioversion in patients with persistent atrial fibrillation: a single-blind, randomized, controlled study. *Am Heart J* 2000;**140**:437–43.
- 43 **Jong G-P**, Hou Z-Y, Juang G-H, *et al*. Short term amiodarone treatment facilitates electrical cardioversion in patients with chronic atrial flutter/fibrillation. *Acta Cardiol Sin* 1995;**11**:39–46.
- 44 **Capucci A**, Villani GQ, Aschieri D, *et al*. Oral amiodarone increases the efficacy of direct-current cardioversion in restoration of sinus rhythm in patients with chronic atrial fibrillation. *Eur Heart J* 2000;**21**:66–73.
- 45 **McNamara RL**, Tamariz LJ, Segal JB, *et al*. Management of atrial fibrillation: review of the evidence for the role of pharmacologic therapy, electrical cardioversion, and echocardiography. *Ann Intern Med* 2003;**139**:1018–33.
- 46 **Coplen SE**, Antman EM, Berlin JA, *et al*. Efficacy and safety of quinidine therapy for maintenance of sinus rhythm after cardioversion. A meta-analysis of randomized control trials [erratum appears in *Circulation* 1991;**83**:714]. *Circulation* 1990;**82**:1106–16.
- 47 **Klein AL**, Grimm RA, Murray RD, *et al*. Use of transesophageal echocardiography to guide cardioversion in patients with atrial fibrillation. *N Engl J Med* 2001;**344**:1411–20.
- 48 **Seidl K**, Rameken M, Drogemuller A, *et al*. Embolic events in patients with atrial fibrillation and effective anticoagulation: value of transesophageal echocardiography to guide direct-current cardioversion. Final results of the Ludwigshafen Observational Cardioversion Study. *J Am Coll Cardiol* 2002;**39**:1436–42.

IMAGES IN CARDIOLOGY

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Brain abscess associated with an unusual cause of right to left shunt

A 33-year-old woman with a history of brain abscess 4 years earlier was admitted with an infected cranial bone flap requiring surgical debridement. Four days postoperatively she was found collapsed, presumed secondary to a seizure. She was resuscitated but developed severe aspiration pneumonia. Systemic pressures were recorded from a left internal jugular line, and a chest x ray (panel A) suggested that it had passed via a persistent left superior vena cava (SVC) into the left atrium and ventricle and into the ascending aorta. The diagnosis was confirmed by echocardiography: intravenous agitated saline contrast from the left arm showed immediate opacification of the left heart (panel B). She died from multiorgan failure 24 h later. Postmortem examination confirmed this isolated anomaly.

Right to left shunts predispose to cerebral abscess. A left SVC draining directly to the left atrium is a rare cause of right to left shunt (<5:100 000 of the general population).

This case highlights two very important clinical issues. Firstly, a brain abscess in the absence of an obvious precipitating cause should prompt a search for a right

Anteroposterior chest x ray showing central venous catheter (dotted line) emerging from the left internal jugular vein/persistent left superior vena cava, entering the left atrium, looping in the left ventricle with the tip in the ascending aorta. Ao, aorta; LA, left atrium; LV, left ventricle.

Transthoracic echocardiography-modified apical four-chamber view showing dense left ventricle opacification only (white) following left arm intravenous agitated saline injection. LV, left ventricle; RA, right atrium; RV, right ventricle.

A Hirth, P Disney, S Thorne
ahir@mac.com

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