width, the presence of dyssynchrony is likely to be the key point for selecting candidates to CRT. However, one issue still remains: what is the best predictive echocardiographic method (among the different Doppler tissue imaging techniques) for selecting those patients? This requires larger studies comparing the positive and negative predictive values of several techniques already published.

From this point, it can be emphasized that heart failure patients (New York Heart Association functional class III or IV) with mechanical LV dyssynchrony should systematically benefit from CRT. So far, no study has clearly demonstrated that medical treatment by itself could reduce the level of ventricular dyssynchrony. If the future confirms that drugs have no significant effect on ventricular dyssynchrony, CRT should be applied systematically in such patients.

Concerning the absence of relationship between the QRS complex morphology and region of latest activation, we fully agree with Bax et al. Ansalone et al. (3) already have demonstrated that placing the LV pacing lead in regard to the region of latest activation could further improve patients benefiting from CRT. However, we think that this might be suitable only in patients with primitive dilated cardiomyopathy. Indeed, by considering patients with severe ischemic heart disease, regions with the latest activation could be highly ischemic, so that pacing from such ventricular areas could be first, potentially arrhythmogenic and second hemodynamically detrimental because it might induce a new dyssynchrony resulting from the low conduction velocity in such regions. For that reason, further studies are crucially needed to definitely state on this point.

Finally, we also agree that the best way to reach optimal LV pacing sites should be the epicardial surgical approach via thoracotomy or mini-thoracotomy procedures. The transseptal approach with endocardial LV pacing could also be considered with the advantage of preserving the endovenous approach and permitting free access to the four ventricular walls.

Stephane Garrigue, MD, PhD
Hopital Cardiologique du Haut-Leveque
University of Bordeaux
19, avenue de Magellan
Pessac 33600, France
E-mail: stephane.garrigue@chu-bordeaux.fr

Hugues Bader, MD

doi:10.1016/j.jacc.2004.05.036

**REFERENCES**


**Serum Potassium Level and Risk of Postoperative Atrial Fibrillation in Patients Undergoing Cardiac Surgery**

We read with great interest the article by MacDonald and Struthers (1) in a recent issue of the *Journal*. The article reports that potassium depletion is important in the pathogenesis of cardiovascular disease and sudden cardiac death. The authors suggest that avoiding hypokalemia is beneficial in several cardiovascular disease states, including acute myocardial infarction, heart failure, and hypertension. The data linking hypokalemia with arrhythmia and cardiac arrest in acute myocardial infarction are fairly strong (2–4).

We want to add atrial fibrillation (AF) after cardiac surgery to the list of cardiovascular diseases where electrolyte imbalance may play an important pathogenetic role. Although the etiology of AF after heart surgery is incompletely understood, stimuli and triggers such as pre-existing structural changes of the atria related to hypertension, mechanical damage, volume overload, age, intraoperative atrial ischemia, and pericardial lesions are thought to play a role in the pathogenesis (5). Additionally, there seems to be a significant increase in sympathetic tone in the postoperative period in those patients who subsequently develop AF (6). Hypokalemia causes cellular hyperpolarity, increases resting potential, hastens depolarization, and increases automaticity and excitability (7). Thus, electrolyte imbalances and hypokalemia may contribute to the etiology of postoperative AF (5,8). To test this hypothesis, we analyzed data from the Study of Prevention of Postoperative Atrial Fibrillation (SPPAF), a randomized, double-blind, placebo-controlled trial at a single tertiary care center of 253 patients undergoing cardiac surgery. The study was designed to test whether each of three active oral drug regimens—amiodarone plus metoprolol, metoprolol alone, and sotalol—is superior to placebo for prevention of AF after cardiac surgery (9). Overall, 39.1% of the total study population developed AF during the postoperative period. Advanced age and surgery for heart valve disease increased, and use of antiarrhythmic drugs, including beta-adrenergic blockers, decreased the risk of postoperative AF by multivariate analysis (p < 0.05). The rate of postoperative AF in patients with serum potassium levels of 3.9 mmol/l or less, compared with those with serum potassium levels of 4.4 mmol/l or greater were 50.7% and 32.9%, respectively (p < 0.05).

Thus, AF after cardiovascular surgery should be added to a group of cardiovascular disease that may be adversely influenced by low serum potassium concentrations. Additionally, potassium replacement may reduce the risk of postoperative AF and should be tested prospectively in a controlled clinical trial.
We thank Auer et al. for their comments on our paper (1). Auer et al. would like to add atrial fibrillation (AF) after cardiac surgery to the list of cardiovascular disorders that are exacerbated by low serum potassium concentrations. Atrial fibrillation is a common and costly complication after cardiac surgery (2). It is significantly more common when serum potassium falls below 3.5 mmol/l, and avoidance of hypokalemia may reduce its incidence (3,4).

The stress of cardiothoracic surgery increases sympathetic tone, and this may predispose one to the development of AF. Interestingly, experimental evidence suggests that sympathetic activity reduces the arrhythmic threshold of hypokalemic dogs (5). This is unsurprising, given the data that link catecholamines with hypokalemia and the favorable effects of beta-blockade on the renin-angiotensin-aldosterone system (6,7).

Therefore, we agree that avoidance of perioperative hypokalemia in patients undergoing cardiothoracic surgery is likely to reduce the incidence of AF in this setting and avoid unnecessary morbidity and costs. A randomized controlled trial of targeted potassium repletion versus standard care is thus warranted.

Aspirin “Allergy” and Resistance

In a recent article, Gum et al. (1) discussed aspirin resistance, and Eikelboom et al. (2) wrote an editorial comment regarding this topic. We have seen several patients who reported that they seemed to have “allergic” reactions to aspirin. These “allergic” reactions consisted primarily of asthma-type attacks. Careful study revealed that these patients are not “allergic” to aspirin in the classical way; inhibition of cyclo-oxygenases by 325 mg of aspirin shifts the arachidonic acid cascade to the lipo-oxygenase branch (Fig. 1). This results in the production of more leukotriene C4, D4, and E4, which together are the “slow-reacting substance of anaphylaxis” and powerful bronchoconstrictors. These patients then refuse to take aspirin and claim that they are “resistant” to and have “allergies” to aspirin.

On the other hand, when patients are given only 81 mg to aspirin. These “allergic” reactions consisted primarily of asthma-type attacks. Careful study revealed that these patients are not “allergic” to aspirin in the classical way; inhibition of cyclo-oxygenases by 325 mg of aspirin shifts the arachidonic acid cascade to the lipo-oxygenase branch (Fig. 1). This results in the production of more leukotriene C4, D4, and E4, which together are the “slow-reacting substance of anaphylaxis” and powerful bronchoconstrictors. These patients then refuse to take aspirin and claim that they are “resistant” to and have “allergies” to aspirin.

On the other hand, when patients are given only 81 mg to aspirin. These “allergic” reactions consisted primarily of asthma-type attacks. Careful study revealed that these patients are not “allergic” to aspirin in the classical way; inhibition of cyclo-oxygenases by 325 mg of aspirin shifts the arachidonic acid cascade to the lipo-oxygenase branch (Fig. 1). This results in the production of more leukotriene C4, D4, and E4, which together are the “slow-reacting substance of anaphylaxis” and powerful bronchoconstrictors. These patients then refuse to take aspirin and claim that they are “resistant” to and have “allergies” to aspirin.

On the other hand, when patients are given only 81 mg to aspirin. These “allergic” reactions consisted primarily of asthma-type attacks. Careful study revealed that these patients are not “allergic” to aspirin in the classical way; inhibition of cyclo-oxygenases by 325 mg of aspirin shifts the arachidonic acid cascade to the lipo-oxygenase branch (Fig. 1). This results in the production of more leukotriene C4, D4, and E4, which together are the “slow-reacting substance of anaphylaxis” and powerful bronchoconstrictors. These patients then refuse to take aspirin and claim that they are “resistant” to and have “allergies” to aspirin.