Commentary

# French multicentre survey on the use of inotropes after cardiac surgery

Olivier Bastien[1] and Benoit Vallet[2], on behalf of the French Study Group AGIR (AGents Inotropes en chiRurgie cardiaque)

[1]Service d'anesthésie-réanimation et équipe d'accueil 1896, Hôpital Cardiovasculaire et Pneumologique Louis-Pradel, Lyon-Montchat, Lyon, France
[2]Departement d'anesthesie-reanimation, Hôpital Claude-Huriez, Lille, France

Corresponding author: Olivier Bastien, olivier.bastien@chu-lyon.fr

Published online: 23 February 2005
This article is online at http://ccforum.com/content/9/3/241


See review, page 266 [http://ccforum.com/content/9/3/266]

*Critical Care* 2005, **9:**241-242 (DOI 10.1186/cc3482)

## Abstract

Results from a French multicentre survey on the use of inotropes after cardiac surgery are presented. Consideration of these findings, which strictly apply only to France, highlights the importance of developing monitoring strategies to help in decision making regarding therapy with inotropes in this context.

During the postoperative period after weaning from cardiopulmonary bypass (CPB), patients are at increased risk for developing a low cardiac output syndrome (LCOS). Despite the availability of a wide range of inotropic agents, no consensus exists regarding the treatment of LCOS after CPB. In this issue of *Critical Care*, Gillies and coworkers [1] review the literature systematically in order to identify, present and classify the evidence regarding choice of inotropic drugs. They observe that insufficient data exist to allow selection of a specific inotropic agent in preference over another in adult cardiac surgery patients; that inodilators such as dobutamine and phosphodiesterase inhibitors are efficacious in the management of LCOS; that, although all β-agonists can increase cardiac output, the best studied β-agonist and the one with the most favourable side effect profile appears to be dobutamine; and that phosphodiesterase inhibitors increase the likelihood of successful weaning from CPB as compared with placebo. The authors suggest that multicentre randomized controlled trials focusing on clinical outcomes are needed.

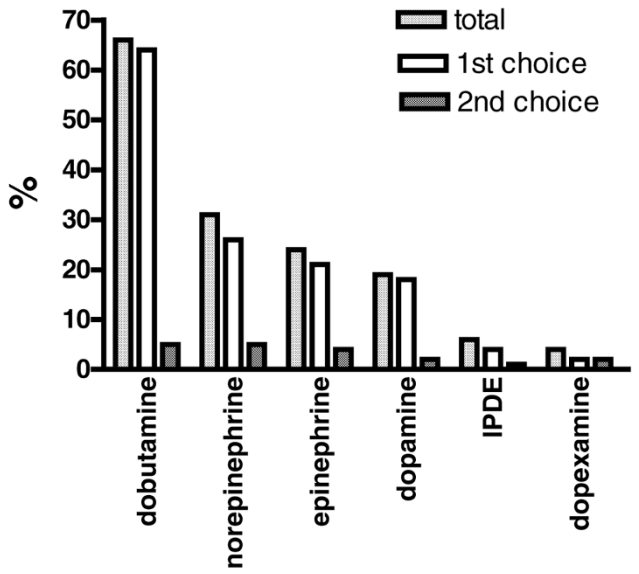
Several comments can be made regarding these important observations. First, the pathophysiology of the underlying cardiac failure (e.g. dilatation, obstruction, associated right heart failure) may impede inotropic effects and therefore influence the choice regarding intropic therapy. Second, although not covered by Gillies and coworkers, combination treatments are often employed in clinical practice and can involve either inodilators or inoconstrictors; a thorough assessment of the effects of such combinations remains to be conducted. Finally, those conducting multicentre randomized controlled trials to clarify the rationale for use of inodilators, potentially combined with inoconstrictors, should carefully consider which monitoring technique is best.

We recently obtained results from a French multicentre survey into the use of inotropes after cardiac surgery (O Bastien, unpublished data) that may shed some light on these issues. The survey was conducted using a questionnaire, which was sent to participating medical centres. Information on a prospective minimum cohort of 15 patients per centre (age >18 years and undergoing cardiac surgery) was anticipated over a maximum period of 1 month. The main objectives were to determine the rate of use of inotropes in LCOS following cardiac surgery, and to identify the diagnostic and monitoring tools used in the treatment of LCOS.

A total of 1368 patients were represented in the survey, 1059 of them were from 30 university or general hospital centres (77.6%) and 309 (22.6%) were from private institutions. Inotropes were used in a total of 513 patients (38%), with this proportion being similar in the various institutions. Coronary artery bypass graft surgery accounted for 57.1% of all interventions. Aortic and mitral valve replacement represented the remaining 32.9% and 9.5%, respectively. One or more inotropes were used in 38% of all procedures requiring CPB. A single inotrope was used in 64% of cases, two inotropes in 26%, and three in 6%.

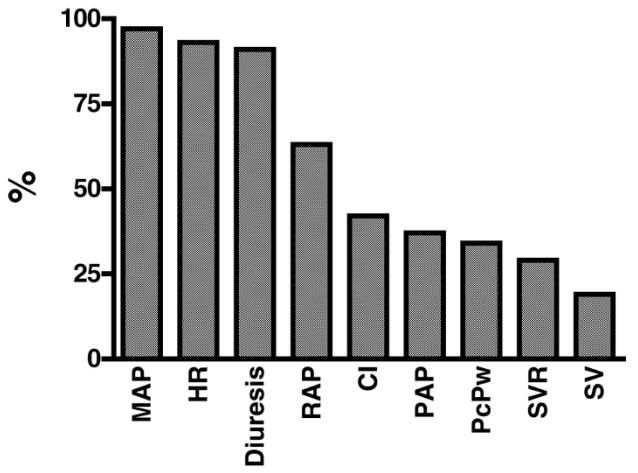
CPB = cardiopulmonary bypass; LCOS = low cardiac output syndrome.

**Figure 1**




Frequency of inotrope prescription in a French cardiac surgery survey (AGIR – AGents Inotropes en chiRurgie cardiaque) as first or second choice ($n = 513$ patients).

**Figure 2**




Haemodynamic parameters measured in clinical practice, as identified in the AGIR (AGents Inotropes en chiRurgie cardiaque) study. CI, cardiac index; HR, heart rate; MAP, mean arterial pressure; PAP, pulmonary arterial pressure; RAP, right atrial pressure; SV, systolic ejection volume; SVR, systemic vascular resistance.

Dobutamine was administered to 334 patients (65%; Fig. 1). Interestingly, norepinephrine was the second most commonly chosen inotrope (157 patients [31%]), followed by epinephrine (24%; Fig. 1). Use of inotropes was determined on a patient-by-patient basis; protocols were followed in only 7% of the patients; and inotropes were used systematically in 2%.

An important component of the survey was to determine the reasons for choices regarding inotropic therapy. In 81% of cases inotropes were used to increase the mean arterial pressure. Other reasons were the presence of low urine output (31%), cardiac output below 2.5 l/min per $m^2$ (30%), and inadequate ejection fraction (16%). In 67% of patients inotropes were started perioperatively; in 30% of the patients they were started postoperatively. Efficacy was assessed by echocardiography in only 37% of patients undergoing coronary artery bypass graft surgery; however, echocardiography was used in 82% following mitral valve surgery. Monitoring of cardiac output was done in only 42% of patients treated with inotropes (Fig. 2).

When considering these results, which strictly apply only to France, one may question the importance of determining the optimal monitoring strategy before conducting any multicentre trial in LCOS. Monitoring strategy means to be able to define, step by step, the appropriate tool to be used, including sufficient specificity for each component of the haemodynamic profile. In our efforts to establish a rationale for use of inotropes in LCOS following cardiac surgery, this will be an important objective to accomplish before we proceed to randomization.

## Competing interests

The author(s) declare that they have no competing interests.

## References

1. Gillies M, Bellomo R, Doolan L, Buxton B: **Bench-to-bedside review: Inotropic drug therapy after adult cardiac surgery – a systematic literature review.** *Crit Care* 2005, **9:**266-279.