

Variations in the Usage and Composition of a Radial Cocktail during Radial Access Coronary Angiography Procedures

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Abstract

A survey was conducted of medication administered during radial artery cannulation for coronary angiography in 2009 in Ireland; responses were obtained for 15 of 20 centres, in 5 of which no radial access procedures were undertaken. All 10 (100%) centres which provided data used heparin and one or more anti-spasmodics; verapamil in 9 (90%), nitrate in 1 (10%), both in 2 (20%). There were significant variations in the doses used. Further work needs to be done to determine the optimum cocktail to prevent radial artery injury following coronary angiography.

Introduction

The radial artery is becoming the preferred means of access for coronary angiography and intervention. This is predominantly because there is a much lower incidence of vascular access complications compared with the femoral approach, and has been facilitated by technical advances leading to smaller calibre catheters and equipment. However, catheter manipulation can be restricted or prevented by radial artery spasm which may be quite painful, and rarely injury to the artery caused by cannulation results in long-term occlusion (0.5%). Various strategies have been proposed to avoid this; these include nitrates and calcium channel blockers to avoid spasm of the artery during the procedure, heparin and hydrophilic sheaths to reduce the risk of occlusion afterwards. We examined the usage of such strategies in the Republic of Ireland in 2009.

Methods

A simple questionnaire was distributed to staff from the catheterization suites in the Republic of Ireland and results collected and collated.

Results

In 2009, there were 20 hospitals where coronary angiography was being performed; 16 fixed suites (1-3 units) and 4 mobile units. Questionnaire responses were obtained from 15, in 5 of which no radial access was undertaken. In the 10 for which data concerning radial access angiography were provided, the median percentage of procedures performed via the radial artery was 25-50%; <25% in three centres, and only one centre where >75% of procedures were radial. All but one centre (90%) used a short hydrophilic sheath. Verapamil and heparin were mixed in the same syringe in 80% and given separately in 20%. In the presence of bradycardia or hypotension, the doses of vasodilators were modified in 40% of centres, but not changed in 60%. In two centres operators did not all use the same regimen. Concomitant sedation with benzodiazepines was sometimes used in 80% of centres.

Discussion

Verapamil and heparin constituted the commonest medications used to reduce the risk of complications during radial artery procedures in Ireland in 2009. However, the doses used and whether these were mixed as a cocktail, or given separately, varied between operators, centres and even between operators in the same centre. As regards vasodilation, multiple studies have been published using nitrate, verapamil, nifedipine and nicorandil, showing them to be more effective than placebo. There have been few comparative studies to suggest which agents are preferable, or which doses. There seems to be little additional benefit in combining two agents in the intra-arterial cocktail. However, though an argument can be made for using sublingual nitrate to vasodilate the radial artery to facilitate initial cannulation prior to intra-arterial cocktail administration, this has never been examined.

The dose of vasodilator was modified in some centres in situations of low blood pressure and/or bradycardia. However, in the majority of centres no reduction was made in the amount of vasodilator administered. There are no published data confirming that the small doses of vasodilators used result in systemic hypotension that leads to significant adverse effects, but it would seem sensible to avoid such problems; this issue warrants further exploration. We did not examine whether operators used a different cocktail for diagnostic versus interventional procedures.

Interestingly, as regards the doses of heparin we observed in use in this study, there is only one published study using the median dose of 2,000 units, and none at all using the lower dose of 1,000 units. The use of 5,000 units has been documented as being more effective than 3,000 in reducing the risk of radial artery occlusion, and a weight-based regimen is equivalent. Though there is good evidence to suggest benefits from using a vasodilator and heparin during radial artery cannulation, practices varied in the different centres studied. There appears to be no evidence-base for some of these differences and more work is needed to determine the optimum drug combination and dosages.

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