

Commentary

Recently published papers: From superbugs to superbowl

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Abstract

Several papers are discussed including the CARP (Coronary Artery Revascularisation Prophylaxis) trial, examining the role, if any, of preoperative coronary revascularisation and a study examining the heart rate in the intensive care unit (ICU) population. We also take a look at infections in the ICU with particular regard to a recent study which examined isolating patients with methicillin-resistant *Staphylococcus aureus* (MRSA).

“Pursue him to his house, and pluck him thence;
Lest his infection, being of catching nature,
Spread further.”

William Shakespeare (1608),
Coriolanus, act III, scene i

Once we were pursued to our own house and left to our own devices but we now find ourselves venturing outside our units and beyond. The role of the critical care physician is ever evolving. Not least among these new tasks is the pre-assessment and optimization of the high-risk surgical patient. The assessment of such patients often leads to a dilemma regarding how far to investigate them. This is particularly pertinent in those awaiting vascular surgery, given their high prevalence of coexistent coronary artery disease. The question of which patients should be considered for coronary artery revascularization preoperatively often provokes much debate. This question has in part been answered by the CARP (Coronary Artery Revascularisation Prophylaxis trial) study, conducted by McFalls and coworkers [1]. Coronary angiography was performed in patients awaiting vascular surgery (either aortic aneurysm repair or arterial occlusive disease of the legs) if they were deemed to be at increased risk for a perioperative complication on the basis of clinical risk factors and the presence or absence of myocardial ischaemia on noninvasive stress imaging.

Patients were eligible for inclusion in the study if the coronary angiogram showed a stenosis of $\geq 70\%$ in at least one major coronary artery. Those patients in whom $\geq 50\%$ stenosis of the left main coronary, left ventricular ejection fraction $< 20\%$, or severe aortic stenosis was found were excluded from randomization because of the proven benefit from intervention. Of the 5859 patients awaiting surgery, 80% were initially excluded because of insufficient cardiac risk, previous coronary intervention without ischaemia, severe coexisting illness, or urgent need for surgery. Interestingly, patient refusal or participation in other studies accounted for just under 11% of exclusions. Of the 1190 remaining patients who underwent angiography, 680 were subsequently excluded: 73 patients satisfied the exclusion criteria mentioned above, 363 had nonobstructive disease and 215 did not have disease amenable to revascularization; a further 29 patients refused to participate. Thus, 510 patients were randomized: 258 to preoperative revascularization (either percutaneous coronary intervention or bypass surgery) and 252 to medical therapy.

There were no differences between those who had undergone revascularization and the control group in terms of death rates, myocardial infarction, or length of hospital stay, although the median time to surgery following randomization was significantly different between groups (18 days in the control group versus 54 days in those undergoing revascularization). No long-term benefits during the follow-up period were demonstrated.

Criticism could be aimed at the relatively short period between revascularization and further operative intervention, which might have negated any potential benefit. However, in many cases delaying any definitive operative procedure for more than 6 months, for example, is not practical and may be associated with increased mortality from the underlying condition. Does this study help in our preoperative

MRSA = methicillin-resistant *Staphylococcus aureus*.

assessment? Well, it does, probably. It tells us that elective coronary artery revascularization in patients with stable disease is of limited value, given the exclusion criteria noted, which is in keeping with current opinion [2]. Unfortunately, it does not tell us which patients to screen. We await further studies to help guide us in that respect.

When faced with a high-risk patient postoperatively on the ICU, we are armed with an impressive array of technologies to monitor their progress. A study published in *Critical Care Medicine* [3] reported on the monitoring of that most vital of signs – the heart rate. Over a 12-month period patients identified as being at high risk of cardiac complications (both medical and surgical) were studied, and the investigators demonstrated that prolonged periods of persistently raised heart rate (>95 beats/min for >12 hours) was associated with increases in both major cardiac events and length of stay. Although more patients in the control group were on preoperative β -blockade, this difference only just achieved statistical significance. Interestingly, significantly more patients in the control group were admitted electively. There was a significant increase in new onset supraventricular arrhythmias, with over 50% of patients with elevated heart rate developing new-onset atrial fibrillation, and this appeared to precede the cardiac events. We should remember to pay attention to the top line of our monitors!

Most 'high-risk intensive care patients will of course have central venous access, and we are all aware of the dangers inherent in this practice, not least that of catheter-related infection. Deshpande and coworkers [4] reported an interesting study on the incidence of infectious complications at various sites of central access. They prospectively studied the incidence of catheter-related infections and colonization at the internal jugular, subclavian and femoral sites. The results make interesting reading, not least because of the overall low incidence of infections, but also in that there was no observed statistically significant difference between the sites in terms of infection. However, the overall trend suggested that the femoral site was the least preferable choice, given that the overall incidences of infection/1000 catheter-days were 0% for internal jugular, 0.45% for subclavian and 1.44% for femoral sites. This is in keeping with a randomized controlled trial [5] that demonstrated an increased incidence in infection when the femoral site was used as compared with the subclavian route.

Given the low overall infection rate, the authors should be congratulated on such good clinical practice. This is a point echoed by Berenholtz and coworkers [6], who reported that catheter-related infections were reduced to zero by a simple mix of staff education, deployment of a vascular access cart, daily assessment of the line, a check list to ensure sterile technique, and the ability of the nurse to halt the procedure if sterility was compromised. This nirvana was achieved by hard work and is what we should all be aiming for, especially

because of the hazards associated with hospital-acquired infections and, in particular, those caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

Once MRSA is identified in any of our patients, much effort is expended in order to try to minimize spread. Although the wearing of gloves and gowns together with adequate hand hygiene is encouraged, many units also 'isolate' infected or colonized patients in order to reduce spread. This practice is often complex and can involve several bed swaps. Moreover, in some cases it may result in closure of that limited resource, the ICU bed. To this end the study conducted by Cepeda and coworkers [7] is useful. They undertook a prospective 1-year study in two intensive care units. All patients requiring intensive care for more than 48 hours were included from two teaching hospital units. The study was elegantly designed, consisting of three phases: phase 1 (first 3 months), phase 2 (middle 6 months) and phase 3 (last 3 months). In phases 1 and 3 any patient colonized or infected with MRSA was moved to a single room or cohort isolated. In phase 2 such patients were only moved if they were carrying other multiresistant pathogens or for other reasons such as neutropenia. There was no difference in other standard and contact precautions, including apron wearing, glove usage and hand hygiene. A total of 866 patients were included in the study, with 168 patients MRSA positive on admission (although screening cultures were available in only 80–87%) and 96 patients acquired MRSA during their stay.

There were no observed differences between phases, implying that moving MRSA-positive patients did not reduce cross-infection in this environment. As the authors rightly point out, isolation of critically ill patients is potentially hazardous and more effective means of preventing spread of MRSA in settings where it is endemic must be found. Rather than spending our time moving our patients, we should concentrate more on essential infection control practices. This was highlighted in this study, in which compliance with hand hygiene in those nurses dealing with high-risk patients was 21%. The data for the clinicians were not presented, but one would hope that this was better!

Finally, given this report on 'superbugs', we turn our attentions to the Superbowl. A study reported in the *New England Journal of Medicine* [8] examined an outbreak of MRSA infections in players of the St Louis Rams football team. Of the squad, 9% developed MRSA infections at turf abrasion sites; 42% of staff and players had MRSA isolated from nasal swabs. The players who developed abscesses were those involved in frequent contact as opposed to those in the backfield. Several other factors were also deemed to be relevant, including not showering before using communal whirlpools and the sharing of towels, both of which – as far as we are aware – are uncommon ICU practices. There was one common theme, however – a lack of regular access to

hand hygiene for trainers who provided wound care. We should all remember that. Now, go and wash your hands!

Competing interests

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

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