

Perioperative strategies to reduce hospital stay : critical comments

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There is a belief in society that the problems associated with anaesthesia and surgery are solved. This is reflected in limited national funding for efforts in these areas. Even if current mortality is low, however, work to improve techniques, patient care and to increase patient satisfaction must be an ongoing undertaking. Anaesthetists play an important role in this development, but our interest has been too limited to the perioperative period. Although strategies implemented during that sensitive period may result in immediate benefits and savings, effects can also be delayed and involve the time spent on the surgical ward and even after discharge from hospital. Moreover, a qualitative picture of all the patient's experiences of the hospital stay has rarely been included in evaluations of what we do in the operating theatre.

HOSPITAL STAY IS A MEASURE OF COMPLICATIONS

The effects of perioperative strategies must be measured, and hospital stay is a practical tool for this purpose. However, hospital stay is subjective and dependent on many factors beyond the control of the caregiver, such as the patient's social environment. In fact, hospital stay is a surrogate end-point which is used because it is easy to quantify and can be translated into economical terms. Another end-point, and which are more interesting from the medical point of view, would be a detailed registration of "complications". In a cohort of 538 patients, BENNET-GURRERO *et al.* described that practically all patients who still remained in hospital 5 days after surgery did so because they had developed some kind of complication (1). Interestingly, perioperative strategies affect the incidence of postoperative complications to a much higher degree than commonly believed.

SENSITIVE RECORDS OF COMPLICATIONS

Several investigators have prospectively used check-lists to detect postoperative complications

with high sensitivity. These even record events that, by some, may be regarded as normal variations of the expected postoperative course, but nevertheless increase cost and prolong hospital stay. Recorded untoward events include nausea and vomiting, pain, need for additional oxygen, wound infection, gastrointestinal problems, oliguria and, interestingly, postoperative blood transfusion.

The incidence of such complications is surprisingly high. In "healthy" patients undergoing surgery that lasts for 1 hour or more the complication rate is about 25% (1,2). In smokers and in patients with cardiovascular disease the complication rate is as high as 50% (3-5). This is both bad news and good news. The bad news is that there are more untoward events actually develop after surgery than we have been aware of. The good news is that much can be improved upon. With such high incidence rates, one can even perform good outcome studies based on 150-200 patients, which is possible for a single hospital to carry out without the need for complex and expensive multi-center trials.

Complication rate is a more complete and informative outcome measure than hospital stay. Ideally, both are reported. Postoperative complications in the hospital should be recorded with an interval of 2-3 days by only a few people, using a detailed checklist. Needless to say, discharge from hospital must be decided by staff without knowledge about which one of tested perioperative treatments that each patient received.

In addition to organizational and direct economical benefits related to "patient flow", changes of perioperative practices should be assessed in these terms. Proposals of preoperative preparations and/or treatment programs will be questioned as long as adequate outcomes studies are lacking. To claim efficacy is not sufficient if "steps of thought" need to be used. For example, if one treatment maintains the arterial pressure within a more

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normal range during anaesthesia is not sufficient alone to implement it on a wide scale. The investigators must also demonstrate direct benefit by conducting studies which show that the new practice reduces complications and, at best, also increases patient satisfaction. Difficulties for preoperative oral carbohydrate loading to become widely implemented in Scandinavia can be understood from a lack of such follow-up.

“COMPLICATIONS” TELL US MORE THAN “HOSPITAL STAY”

There are several approaches that reduce complications and hospital stay, and these are discussed by many well-known authorities at this meeting. To quit smoking before surgery is helpful (3) and adding epidural analgesia to general anaesthesia reduces the incidence of pulmonary complications after major surgery (4). Optimization of fluid status before anaesthesia is induced shortens hospital stay and/or reduces specific complications (6-9). This has usually implied that more fluid volume is infused. In contrast, an interesting multi-centre study of liberal and restricted fluid administration from Denmark shows that more fluid makes worse during colon surgery (4). By only recording hospital stay, we would be without any clue as to the mechanisms that serve to explain the success of the restricted fluid program, and which reduced the incidence of complications from 51% to 33%.

In this Danish study, the differences could primarily be attributed to anastomotic leakage, sepsis, pulmonary oedema and bleeding. My interpretation is that crystalloid fluid particularly accumulates in the subcutis and in the walls gastrointestinal tract, with subsequent stretching of the anastomotic sutures applied during colon surgery. This view can, together with the experiences of the beneficial effects of restricted fluid administration in uncontrolled haemorrhage (10), provide us with a view of what makes liberal fluid administration less suitable in colon surgery. This view might be expanded to a hypothesis that can be used to design new studies.

As an important part of the problems in colon surgery is related to anastomosis leakage and subsequent sepsis, the same problems may not return if we practice liberal fluid administration in other types of surgery. It should be warned against generalizing results between different types of surgery and between vastly different patient groups. This is a common form of misinterpreting results.

MORTALITY

Mortality may be used as an outcome measure if the incidence is high enough. We normally reserve this measure for intensive care patients, but mortality is in fact quite high within 30 days after many surgical procedures, too.

A national survey in the USA showed that the 30-day mortality after venous by-pass surgery in the leg, cystectomy and colectomy is about 5%, while mortality after pneumectomy and resection of the oesophagus averages 15% (11). This study highlighted the variability of the mortality between different hospitals depending on how many patients in each group they perform each year. In another study of high-risk patients undergoing surgery, 30-day mortality was 7.7% regardless of whether the cardiovascular status was followed by a pulmonary artery catheter or not (12). Naturally, when figures are this high, mortality becomes a useful and important outcome measure.

A sensitive detection of complications is still very important since mortality provides an incomplete figure for the “success” of a treatment. For example, death due to myocardial infarction is a useful measure of how affected a particular population is by cardiovascular disease. A much better measure is to study death in myocardial infarction and *also* the incidence of non-lethal myocardial infarction. This gives us a much more complete picture of the situation. Moreover, there are sensitive tests for detection of non-lethal myocardial infarction while diagnosing lethal infarction has a higher degree of uncertainty, in particular outside hospital.

SLOW AND FAST IMPLEMENTATION

Medical practices may be implemented too slowly or too fast. Prehospital thrombolysis is one example of a treatment that has been implemented too slowly. There were several well-conducted studies already in the 1970s which show that prehospital thrombolysis is effective, but the therapy was not implemented until 20 years later. Insulin treatment of critically ill patients is an example of a practice that has been implemented too fast. This is well supported in cardiac disease and after cardiothoracic surgery (13-15). In my hospital, we treat none of these categories of patients at the intensive care unit but those who have undergone vascular and abdominal surgery as well as trauma patients. The normoglycaemic regimen using

insulin has been implemented as the norm in these patient groups, despite lack of evidence. When asked, the ICU doctors say they are “convinced” that the treatment is good, which is not a scientific standpoint. The situation is the same in the vast majority of the hospitals in Sweden. The view that what is good for primarily cardiac patients can be generalized to all intensive care patients has caught surprisingly little suspicion, and has been continued by others (16).

New practices and methods can be implemented too slow and too fast for various reasons. One important factor is the journals selected for publication and whether the new practice has been presented at scientific meetings with high impact. However, only the strength of the scientific evidence and the practical/economical feasibility should be allowed to play a role in these decisions, for which the national and international organizations in anaesthesia and intensive care have a great responsibility. The need for them to take an active role in spreading information and implementing new perioperative strategies and methods is emphasized by the fact that commercial patents are usually not involved. These changes are not stimulated by investors from medical companies in the same way as for drugs.

There are also more odd factors playing a role in implementing new methods and strategies. Fifteen years ago, legal cases in the USA boosted a quick and worldwide implementation of the pulse oximeter. In my experience, surgeon’s pride and unwillingness to accept and deal with own complications has made it almost impossible to implement simple approaches to measure fluid absorption in transurethral surgery. Some 100 prospective studies show that fluid absorption is a widespread and universal phenomenon which leads to symptoms and complications (17,18). When bringing up this issue, however, urologists typically respond that their own particular hospital, for various reasons, does not have that complication. Hence, development of safety and patient care is blocked if the potential for improvement is not acknowledged by those involved in the medical care.

WHEN SHOULD NEW PRACTICES BE IMPLEMENTED ?

When is the right time to implement a perioperative strategy ? In my opinion, this point in time occurs when 3 studies from different groups show a beneficial effect with respect to outcome. As argued above, the evaluation should involve a

sensitive follow-up system with the aim of recording complications. It is desirable to include qualitative measures (such as patient satisfaction) as an adjunct. Such views might be called for also after discharge from the hospital.

CONCLUSIONS

National and international anaesthesia organizations should take a more systematic responsibility for evaluating, recommending and implementing perioperative strategies and techniques. At present, too many random factors govern when a strategy becomes current practice. In my opinion, a method should be seriously considered in the clinic and, if feasible, be implemented if a clear benefit has been demonstrated by three independent research groups. The most important tool for determining clinical efficacy new strategy is a sensitive record of complications, for which hospital stay is a surrogate endpoint. Qualitative measures should also be involved, but this is rarely the case today. Mortality is a rough end-point and does not tell the whole story, but it becomes important when the rate exceeds a few percent.

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