

EDITORIALS

Patient-centric goal-oriented perioperative care

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Anaesthetists and surgeons largely focus on quantifiable postoperative outcome measures as a means for improving the quality of patient care. However, whilst traditional measures, such as postoperative morbidity and mortality, are useful and relatively straightforward to audit, they do not always reflect outcomes that are meaningful and relatable to the individual, especially if the patient has complex health needs.

A patient-centric goal-oriented approach to surgical and perioperative care considers the holistic needs and health goals of the individual, which include symptom resolution, improvement of physical function and mobility, and resumption of normal social interactions and roles.^{1,2} Adoption of this goal-oriented model of care provides a means for identifying the realistic expectations of the individual patient and the mechanisms to achieve them.

Current practice in surgical outcome monitoring

Traditionally, clinicians have concentrated on development of procedures designed to treat the condition (problem-oriented medical care) and have gathered short-term outcomes to benchmark their results and validate their practice; length of

hospital stay, readmission rates, pain scores, and 30 day morbidity and mortality are some of the more common outcomes.

A legitimate concern for traditional outcome measures is that they record adverse events based on their relevance to healthcare providers and funders, but do not necessarily consider what is pertinent to the individual patient. To complicate matters, economic inducements and patient demand have led to the development and offering of procedures that may be of low therapeutic value or have the propensity to cause more harm than benefit.³

Patient-reported outcome measures (PROMs), and to a lesser extent patient-reported experience measures (PREMs) of care, are useful additions to standard surgical outcome measures and have become indices for quality of treatment.⁴ However, as they often rely on patient satisfaction, they may not provide a true reflection of health improvement and the quality of care.

Patient-centred surgical outcome measures

To overcome limitations of both standard surgical outcome measures and PROM/PREM data, it has been recognised that

Table 1 Selected patient scenarios with possible outcomes.

Patient scenario	Patient goals	Therapeutic option	Best possible outcomes	Worst possible outcomes
Elite athlete with anterior cruciate ligament rupture	Return to professional sports	Surgical repair	Return to full function	Surgical failure Long-term disability
		Physiotherapy	Good function, but below level necessary for professional sport	Inadequate long-term function
65-yr-old man with locally advanced oesophageal cancer	Attend daughter's wedding in 4 months' time Long-term survival	Chemoradiotherapy with surgical resection	50% 5 yrs survival; permanently reduced quality of life	2% perioperative mortality risk; intolerable long-term side-effects of surgery
		Palliative stent and chemoradiotherapy	Alive and able to attend wedding; life expectancy 1–2 yrs	Small risk of early mortality from stent/chemoradiotherapy
85-yr-old with incidentally diagnosed 6 cm infrarenal abdominal aortic aneurysm; not amenable to endovascular repair	Survival and maintain independence at home	Open aneurysm repair	Successful repair; 6–12 months recovery period; potential for long-term reduction in quality of life	5% perioperative mortality risk; never regaining independence
		Observation	No reduction in quality of life	14% annual risk of rupture and death
62-yr-old man with diabetes mellitus, BMI of 40 kg m ⁻² , and lifestyle-limiting hip pain attributable to osteoarthritis	Reduced pain and increased mobility	Total hip replacement	Reduced pain	Failed/infected surgical repair; persistent pain; function worse than it was preoperatively
		Weight loss and physiotherapy	Reduced pain; increased mobility; prolonged life expectancy; option of lower-risk surgery in the future	Failure to lose weight; unchanged poor function
87-yr-old widow who has carers, but lives alone with a displaced intracapsular neck of femur fracture	Absence of pain; return to previous level of accommodation; a good death	Cemented hemi-arthroplasty	Return to previous level of function; pain controlled; dying a good death in comfort	Bone cement syndrome; delirium; reduced cognitive function; requires higher level of post-hospital care; intraoperative death
		Conservative treatment	Requires higher level of post-hospital care after prolonged hospital stay	In-hospital death after slow and unpleasant deterioration
78-yr-old with congestive cardiac failure, limited exercise tolerance, and perforated diverticulitis	Maintaining independence and acceptable quality of life	Hartmann's procedure	Survival at cost of prolonged hospital stay; permanent stoma; likely reduction in quality of life	In-hospital death after slow and unpleasant deterioration
		Palliative care	Dying in comfort	Dying in discomfort

delivery and assessment of the quality of healthcare need to evolve.⁴ In 2008, the 'triple aim' was first suggested as a vehicle to implement interventions that are relevant to individual patients, and improving the health of populations and reducing the *per capita* cost of healthcare.⁵ The first two aims are aligned with those of the Patient-Centered Outcomes Research Institute (<https://www.pcori.org>), which recommends that medical care should focus on outcomes that people notice and care about, such as survival, function, symptoms, and health-related qualities of life.

In addition, it has been suggested that there are five meaningful domains of patient-centred outcomes that are relevant to surgical patients.^{6,7} These are

- (i) life impact (survival)
- (ii) patient satisfaction
- (iii) functional status

(iv) well-being

(v) health-related quality of life (HRQOL).

A sixth domain of preparation for and improving the chances of a good death^{1,8,9} may be added to this list.

Goal-oriented patient care

Recognising that some treatments and interventions may cause harm, specialties, such as family practice and care of the older adult, have advocated a move to 'goal'—rather than 'problem'—or 'diagnosis'-oriented patient care.^{1,2} In addition to aligning with the components of the triple aim of healthcare delivery,⁵ this approach promotes attainment of specific and realistic health goals that are relevant to the individual patient.

Goal-oriented perioperative care can be considered as having two components: firstly, to identify the realistically

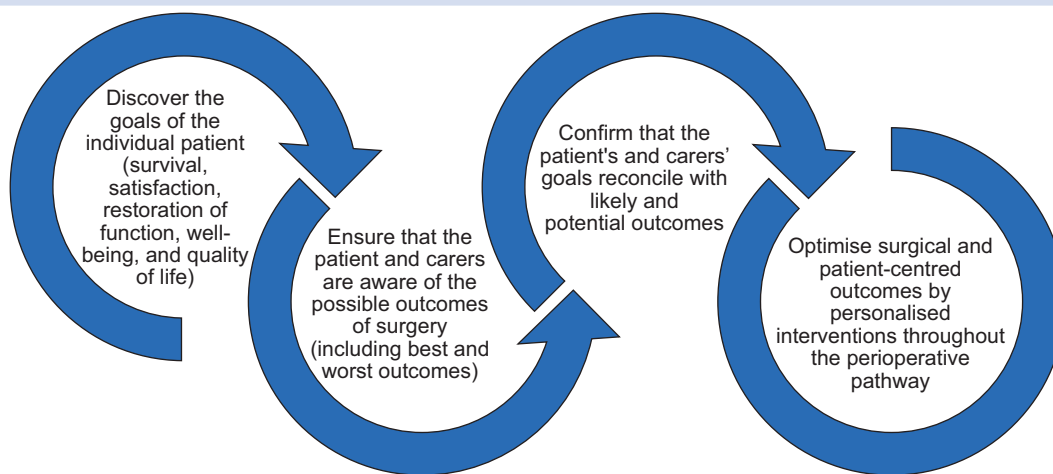


Fig 1. Meaningful discussion to personalise decision-making and optimise outcomes.

achievable goals of the individual patient (based on the aforementioned six meaningful domains of patient-centred outcomes),^{6,7} and secondly, to devise a treatment pathway for the patient, in which these goals are the objectives of perioperative care. When it is perceived that the preoperative level of HRQOL will not be achieved or the patients will not return to their previous accommodation,¹⁰ these concerns should form a core component of the meaningful discussion process before surgery.¹¹ At this point, some patients may refuse surgery if the prospect of deterioration of function or cognitive impairment is real, and may consider other therapies or even the option of doing nothing.^{12,13}

To meet this patient-centric approach, a fundamental change is required in patient and procedure selection, perioperative care, and rehabilitation, with a focus on medium- to long-term outcomes that matter to the individual patient.⁷ Furthermore, patients (and their families and carers) and perioperative healthcare professionals need to be aware that recovery from a surgical procedure is a continuum that starts in the immediate postoperative phase and often extends for several months, and that sometimes resumption of normal function and activities may not be achieved.¹⁴ These factors must be considered in the shared decision-making process.^{11–13,15}

Using patient goals to promote postoperative recovery

Full recovery from surgery, as defined by Allvin and colleagues,¹⁶ can no longer be seen as readiness for discharge from hospital, but should be regarded as an energy-requiring process that includes several attributes:

- (i) a return to a state of normality and wholeness defined by comparative standards
- (ii) regaining control over physical, psychological, social, and habitual functions
- (iii) returning to preoperative levels of independency/dependency in activities of daily living
- (iv) regaining one's optimal level of well-being to which, in view of the problems associated with persistent postoperative opioid use, may be added

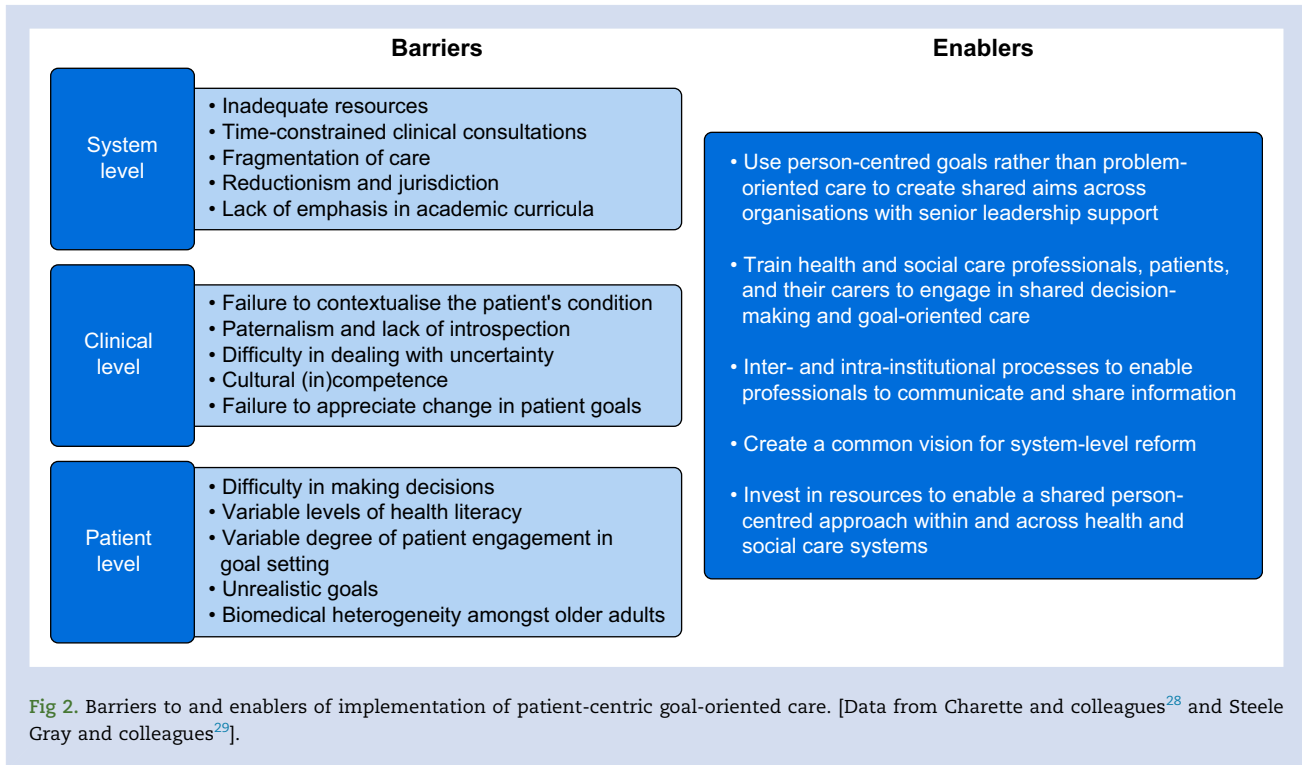
(v) cessation of all postoperative analgesia.^{17,18}

Tribble and Julliard¹⁹ expanded the concept of consent to include full disclosure of best- and worst-case scenarios for surgical outcomes. This places the onus on the surgeon to ensure that the patients and their families or carers have a clear understanding of the short-, medium-, and long-term effects of surgery: the classical description of 'informed consent' is superseded by the concept of 'shared decision-making' and introduces the concept of a 'therapeutic alliance' between the patient, family, carers, and treating team.^{12,13}

Patients' definitions of recovery can depend on their situation and expectations, and it is useful to train perioperative care teams to discuss best- and worst-case outcome scenarios with patients and their family and carers²⁰ (Table 1). Surgery can sometimes have such a deleterious effect on function and independence that even if a good 'clinical' result (i.e. 30 day survival) is achieved, the outcome is catastrophic for the individual patient if the goals are not met.⁷

The multidisciplinary perioperative team must understand the personal goals of the patient through meaningful dialogue and reconcile these with what is realistically achievable, and secure a shared understanding of the possible outcomes of treatment (Fig 1). This is now mandated by the UK General Medical Council in the recently published professional guidance on decision making and consent.¹¹ In addition, the concept of utilising the period between diagnosis and admission for surgery to prepare the patient better for surgery is now being increasingly accepted as a method for improving patient-centred outcomes.¹³ This can be achieved by having conversations around shared decision-making and optimising the patient physiologically, medically, and psychologically. Healthcare professionals should realise that, although their knowledge, experience, and opinions can guide the decision-making process, it is the patient who should be the real decision maker. Sometimes, doing nothing, in accordance with the patient's wishes, goes a long way in achieving the patient's goals.

There remains the challenge of reconciling what is achievable from surgical care with what the patient desires. Whilst most surgical procedures can be reasonably expected



to result in a return to baseline or better function, some (e.g. oesophagectomy) result in a long-term reduction in quality of life.²¹ Research in the field should bring clinicians and patients together to describe the challenges of these treatments in a manner that can be explained to patients pre-operatively, and informed consent must include some understanding of the achievable functional recovery and impact on HRQOL.

Perioperative implications of meaningful discussion and shared decision-making

The concepts of meaningful dialogue and shared-decision making are designed to enhance communication between the patients, carers, and treating team, and aid the patients in making what they judge to be the appropriate choice of therapy.¹¹ There is now a responsibility on the treating team to disclose any risk of serious harm, irrespective of how unlikely it is to occur, and this may raise ethical and legal issues.²² Clinicians may also be faced with a moral dilemma when a high-risk patient opts for a high-risk intervention, despite being fully informed that it is highly likely that the intervention may result in death or disability. Many of these concerns may be resolved with risk assessment and multidisciplinary dialogue. However, just as clinicians may seek guidance from a local clinical ethics committee in the event of disagreement about the best interests of a patient lacking capacity, it may occasionally be necessary to refer decisions made by patients with capacity to ethics committees.

Implementation of patient-centric goal-oriented perioperative care

Perioperative care embraces the concept of integrated multidisciplinary care of patients from the moment surgery is

contemplated through to full recovery. It is now appreciated that before listing for surgery, the goals of the patient must be ascertained,¹¹ and this can only occur through meaningful discussion based on evidence-based risk assessment.²³ Once the patients have decided that surgery is the desired option for them, multiple interventions can and should be undertaken to improve the subsequent surgical and patient-centred outcomes.¹³ These interventions include lifestyle modification, comorbidity optimisation, drug modification, surgery school, and pre-habilitation (physical, nutritional, and psychological optimisation).¹³

Perioperative care, often bundled as 'enhanced recovery after surgery' programmes, has changed beyond recognition over the past two decades, with significant steps forward in optimising physiology, recovery of organ function, analgesia, and early recovery of independence.²⁴ The promotion of earlier restoration of function, mobilisation, and safer earlier hospital discharge is also being promoted by strategies advocated in the international #EndPJPparalysis campaign (<https://endpjp paralysis.org>): 'get up, get dressed, get moving'.²⁵

Rehabilitation and, increasingly, pre-habilitation are approaches to optimising the rate and extent of postoperative recovery. Both pre- and postoperative approaches focus on general cardiovascular fitness (particularly in the setting of major thoraco-abdominal surgery) and more focused recovery of function (e.g. after orthopaedic surgery).^{26,27} Pre-habilitation and rehabilitation are central to recovery and span the time from the decision to operate to beyond hospital discharge.

Discharge from hospital should be regarded as a watershed moment in the continuum of recovery, but not the endpoint of recovery. Key goals should be set to allow discharge, including degree of independence, physical rehabilitation, nutrition, and a proactive plan to reduce use of analgesics. Clear guidance should also be given on time to return to driving and measures to reduce opioid-related harm.¹⁸

Many operations carry long-term sequelae, and management of the recovery process must include plans to support and monitor the patient for expected and possible late effects, including malnutrition, functional failure of the procedure, disease recurrence, and ensuing psychological effects.

However, there are several barriers that may hinder the realisation of the benefits of patient-centric goal-oriented perioperative care. These barriers arise at the system, clinical, and patient levels,²⁸ and overcoming them requires implementation of several enablers at various levels of the health-care system²⁹ (Fig 2).

Conclusions

Improvements in objective, clinician-centric postoperative outcomes, such as reductions in morbidity and mortality, represent a major advance in surgical care. We are now able to offer multiple procedures, with well-described morbidity and mortality risks, to even high-risk patients with a reasonable expectation of survival to hospital discharge. However, treatment and life goals of the patients should be explored through meaningful dialogue, and these should be incorporated into shared decision-making throughout the patients' healthcare journey.¹¹ In addition, once these goals are articulated, clinicians can implement relevant strategies to ensure that these patient-centric goals are the focus of clinical care. Furthermore, patient-centric outcomes should no longer be regarded purely as academic research tools, but as clinical goals. Clinicians and healthcare teams will need to individualise their approach to achieve these patient-centric goals, and healthcare providers will have to allocate resources to enable this.

Declarations of interest

None of the authors has a direct conflict of interest to declare. DNL has received a speaker's honorarium from Fresenius Kabi for unrelated work in the past 36 months.

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What is the true worth of a P-value? Time for a change

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Losing faith

The definition of a P-value is the probability that, for the sample data, no difference exists between the explored variables. It confers no meaning with respect to the cause–effect relationship, nor its size nor presence. Yet over time, the P-value seems to have acquired the unconscious assumption that if a study reports a significant P-value (in general, $P \leq 0.05$), then there must be a true difference between samples' representative populations. This is not an appropriate conclusion to make, and proving cause and effect remains a separate issue.

The origins of the P-value cut-off of $P < 0.05$ for significance can be traced back to the mid-1920s and were proposed by Fisher in describing robust ways to identify significance in agricultural field tests.¹ Yet a value of $P < 0.05$ meant for agriculture, seems to be applied throughout medical research without real justification. In medicine, where peoples' lives may change on the outcomes of these trials, an individual might expect a more stringent P-value cut-off when the cost of being wrong is more consequential.

As a group, we have been struck by the prevalence of misconceptions regarding interpretation of statistics. This may be attributable to insufficient teaching within clinical and research training, and poor reporting of statistical methods within articles. These factors conspire to generate a fear of statistics; and admitting this is difficult. This in turn has led to both a poor understanding of and an over-reliance on the P-value as some form of currency of how good a study's conclusions are. The fault is not entirely with us though, as access

to a statistician, particularly one who also understands the medical field, is difficult.

Unsurprisingly then, there is growing dissatisfaction with the P-value as researchers spend huge resources to achieve a statistically significant result only to find it overturned on study replication or by a meta-analysis. An extreme example of this is the banning of P-values in some journals.² There is so much concern about P-value misuse that the American Statistical Association issued a statement on statistical significance and P-values in 2016³ summarising it essentially as:

- An indicator of how incompatible the data are with the specific statistical model.
- Not a measure of the probability that the studied hypothesis is true, or the that the data were produced by random chance.
- Scientific conclusions and business or policy decisions should not depend solely on the P-value, with scientific inference requiring full reporting and transparency.
- Not a measure of effect size or importance.
- Nor is it by itself a measure of the evidence for a model or hypothesis.

Back to basic principles

There are also growing efforts to move away from P-values towards other measures to better portray the reliability of conclusions. In our opinion, this is incorrect as the P-value is the cornerstone of statistical testing. Many replacements are offered such as confidence intervals along with P-values, Bayesian likelihood of the null hypothesis vs the