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REVIEW

Patient-Centred Preoperative Assessment

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Abstract

Patient-centred preoperative assessment describes an approach to preoperative assessment based on early screening and triage, optimisation of comorbidities and lifestyle, shared decision-making and multidisciplinary working. This approach tailors preoperative assessment to the individual circumstances of the patient, taking into account their comorbidities, functional status, health needs and lifestyle, and also their wishes and desired outcomes from surgical interventions (or, in some cases, the avoidance of surgery). This review outlines the components of patient-centred preoperative assessment, the relevant evidence, and practical approaches that can be used to facilitate patient-centred services.

Key words: perioperative medicine; perioperative care; shared decision-making; prehabilitation

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Introduction

Preoperative assessment is an integral part of a patient's journey from initial contact with healthcare through to the surgical procedure and postoperative recovery period, or to the decision not to proceed with surgery. The objective is to ensure that the patient is in an optimal condition for surgery, according to the time available, and accounting for the patient's unique needs, circumstances and wishes. There is evidence suggesting that preoperative assessment has beneficial effects on outcomes for older surgical patients (Partridge et al, 2014), and that reduced preoperative fitness is associated with postoperative morbidity (Snowden et al, 2010; West et al, 2014). Similarly, preoperative optimisation of conditions such as anaemia is associated with improved postoperative outcomes (Fowler et al, 2015). Preoperative assessment for elective surgery is therefore recommended by national organisations including the Royal College of Surgeons of England, the Royal College of Anaesthetists, the Royal College of General Practitioners, and the Intensive Care Society, and joint guidelines exist to promote this (CPOC, 2021).

Generally, preoperative assessment involves some form of contact prior to a surgical procedure with a healthcare professional—in most cases, a pre-assessment nurse—for the patient to provide information about their own medical and social history; for data to be gathered about the patient such as height, weight and baseline observations; and to obtain investigations such as blood tests or an electrocardiogram (ECG). Advice on how the patient should prepare for surgery can also be

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given, as well as information about postoperative recovery. Surgical consent is usually a separate process that takes place in the surgical outpatient clinic. Within this broad framework, there are many different configurations of services, patient pathways and processes that vary in their ability to provide an individualised and patient-centred approach to preoperative assessment. This review outlines the principles behind patient-centred preoperative assessment, and how these can be implemented to provide a more personalised and targeted approach.

Defining the Patient-Centred Approach to Preoperative Assessment

Patient-centred preoperative assessment is characterised by its focus on placing the patient at the centre of considerations and decisions around their perioperative pathway (the journey from initial surgical referral to post-surgical follow-up). This can be contrasted with a traditional 'one-size-fits-all' approach to preoperative assessment, which applies the same, standardised work-up for every surgical patient. This approach was commonly seen two decades ago in the UK, without dedicated preoperative assessment clinics, and with few guidelines and little standardisation of processes. This approach did not allow for variation in patients' comorbidities or individual circumstances, and did not easily facilitate multidisciplinary working or shared decision-making (SDM) (Brazil et al, 2021; Grocott et al, 2017).

Instead, using the patient-centred approach, the patient's perioperative pathway is shaped by their individual needs according to comorbidities, frailty, type of surgery and overall level of risk, as well as their psychological and social circumstances.

In real-world preoperative assessment settings, many of these patient-centred approaches will already be in place. The fundamental aspects and practicalities of patient-centred preoperative assessment are outlined in this review—namely early screening and triage, optimisation, quantitative risk assessment and SDM—to inform further development and evolution of existing preoperative assessment services.

Early Screening and Triage

Key to patient-centred preoperative assessment is the principle of early screening and triage. Ideally, patients being referred to secondary care should already have had a review of their comorbidities by their primary care physician. From the moment a surgeon makes a decision to operate, the patient should undergo early screening (which may be through the completion of a paper or online questionnaire), and if not recently done, have baseline observations recorded, height and weight measured, and specific blood tests performed. This is illustrated in Fig. 1, which shows an example of patient flow through this model, and how preoperative assessment services can use screening to triage patients into high-, medium- and low-risk groups according to their comorbidities and type of surgery. The "Getting it Right First Time" (GIRFT) guidance details how these groups might be assigned (Snowden and Swart, 2021).

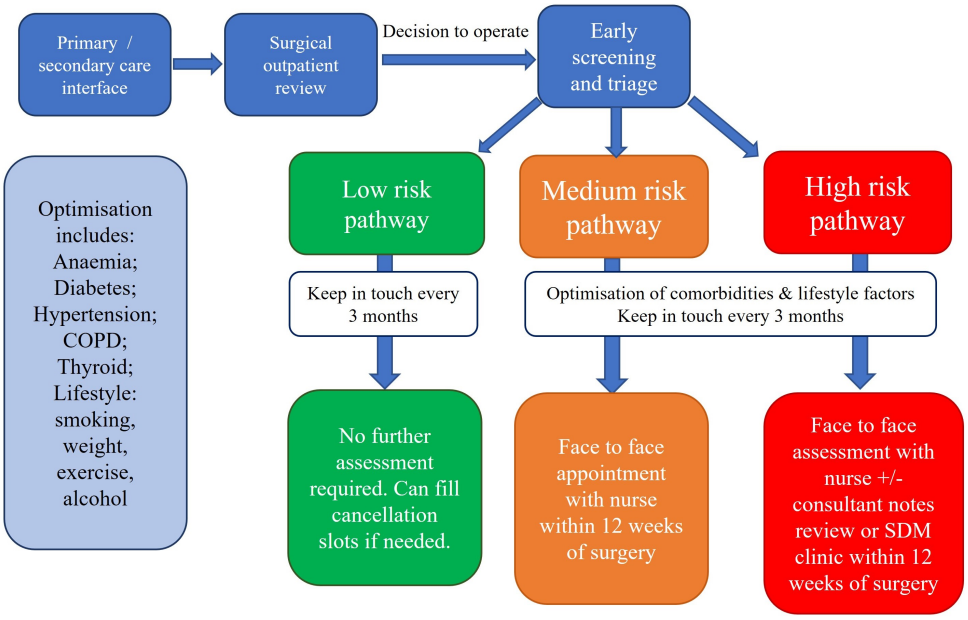

Fig. 1. An example of flow through a patient-centred preoperative assessment model. COPD, chronic obstructive pulmonary disease.

Optimisation

Following triage, those in the high- and medium-risk pathways should undergo a focused review to assess whether any comorbidities or lifestyle factors can be optimised prior to surgery. Common conditions amenable to this include hypertension, type 2 diabetes, thyroid disease, heart failure, anaemia, obstructive sleep apnoea (OSA), and chronic obstructive pulmonary disease (COPD). Preoperative assessment clinics should have local guidelines tailored to available local services and based upon national guidelines to facilitate a standardised approach to optimisation of these common conditions by a nurse-led service (Many of these guidelines are co-ordinated and published by the Centre for Perioperative Care (CPOC), which is a multi-speciality centre representing a number of associations and Royal Colleges involved in organising and delivering perioperative care in the UK) (AAGBI, 2016; CPOC, 2022; CPOC, 2023a; CPOC, 2023b).

Lifestyle factors which can be addressed include smoking, alcohol use, diet, obesity, and activity levels. The Centre for Perioperative Care (CPOC) has a range of resources for perioperative smoking cessation, which can result in improved postoperative outcomes, with a simple assessment and advice tool available on their website (CPOC, 2024). Preoperative assessment services can also utilise a range of local services to support patients either by direct referral or signposting.

There is some evidence showing that prehabilitation programmes—usually in the form of structured or supervised exercise programmes prior to surgery—can improve postoperative fitness and activity levels (Fleurent-Grégoire et al, 2024; Konnyu et al, 2023; Molenaar et al, 2022; Punnoose et al, 2023; Toohey et al, 2023). The

Wessex Fit 4 Cancer Surgery Trial (WesFit) is currently ongoing, with the aim of providing meaningful evidence around prehabilitation and postoperative outcomes (West et al, 2021).

Commencing the optimisation process early also gives the patient some control, allowing them to take an active part in their preparation for surgery as well as utilising time spent on a surgical waiting list productively, 'turning waiting lists into preparation lists' (Levy et al, 2021).

It is important to recognise that not all patients are on truly 'elective' pathways, and therefore the time available for optimisation will vary according to type of surgery; examples of these surgeries include cancer surgery and revascularisation procedures for chronic limb-threatening ischaemia (VSGBI, 2019). In these cases, there is always a risk-benefit analysis to be done, as delaying surgery to facilitate optimisation can itself introduce more risk than the lack of optimisation. Senior clinicians should be involved in an SDM process with the patient in these cases.

Low Risk Pathways

A significant proportion of patients will meet the criteria for a low-risk pathway. It is anticipated that most of these patients will have their procedure as a day case. After screening and triage, they need to be able to obtain all of their preparation for surgery (which may involve a methicillin-resistant staphylococcus aureus (MRSA) swab and information about their procedure, anaesthetic risk and starvation guidance) either remotely or through a brief appointment with a healthcare assistant.

These patients can provide a 'pool' of patients who may be able to be slotted into last-minute cancellation slots, and they can fill 'high volume, low complexity' (HVLC) lists, which may be able to utilise remote sites or weekend lists which may not be appropriate for complex cases.

This group of patients is better served by avoiding unnecessary lengthy preoperative assessment input, thus avoiding additional periods of absence from work or unnecessary travel to the hospital (which may create burdensome implications for childcare or other carer arrangements). It also drives more efficient use of preoperative assessment resources, which can instead be focused on higher risk patients. A hypothetical example of this could be a 34-year-old man with no underlying comorbidities requiring a knee arthroscopy; all information required could be obtained through a screening questionnaire (on paper or online). He could then receive preoperative instructions via email, patient portal or post and thereby avoid an unnecessary hospital attendance for his preoperative assessment.

Medium- and High-Risk Pathways

Individualised Risk Assessment

For medium- and high-risk patients, further individualised risk assessment is required to estimate a patient's risk of postoperative mortality and/or complications. The first step is a clinical assessment, usually by a preoperative assessment nurse,

including a full history, clinical examination and a set of investigations, which provides the basis for judgement of a patient's perioperative risk.

Subsequently a functional assessment can be performed, which could include the Duke Activity Status Index (DASI) questionnaire, cardiopulmonary exercise testing (CPET), or the 6-minute walk test (Hlatky et al, 1989). CPET is a comprehensive physiological examination which provides a wealth of information about the patient's physiology and allows analysis of the reason for exercise limitation; tools have been devised to support quantitative risk prediction based on CPET results (Carlisle et al, 2015). However, it is resource-intensive in terms of space and equipment; requires trained personnel to administer and interpret the test; and some high-risk patients may be precluded from CPET, particularly those who have limited mobility. CPET is particularly useful to support SDM for major surgery where there may be multiple different treatment options. An example of this would be for patients with abdominal aortic aneurysms. When this condition reaches the treatment threshold, if anatomically amenable, there may be three options: an open repair, an endovascular repair, or conservative management. Open repair is physiologically demanding surgery with a high complication risk, although once successfully carried out needs little ongoing monitoring. Endovascular repairs are less demanding but require ongoing surveillance and carry the risk of endoleak and further procedures. CPET provides useful information regarding functional capacity and risk assessment as to which of these options may be most suitable for a given patient.

The third aspect of this is a quantitative risk assessment to support clinical judgment on the level of risk, aid communication with the patient in the SDM process, and support planning for intra- and post-operative care. Quantitative risk prediction uses validated scoring systems to provide patients and clinicians with an individualised estimated percentage risk for both mortality and morbidity postoperatively. Examples of these are listed in Table 1.

The Surgical Outcomes Risk Tool (SORT), and the subsequent SORT-2 score, have been shown to have good predictive performance and clinical usability, and SORT-2 is recommended in the GIRFT guidance on preoperative risk assessment (Protopapa et al, 2014; Snowden and Swart, 2021; Wong et al, 2020). SORT is of particular utility as a screening tool as it can be incorporated into preoperative assessment software, with all of its variables usually collected as part of a preoperative assessment process, allowing automatic generation of a SORT score for every patient. This was done at Colchester Hospital during the digitalisation of preoperative assessment. The formula for calculating the SORT was built into the Synopsis IQ™ preoperative assessment software, such that, provided the nurses completed the correct fields, a SORT risk score was calculated for each patient undergoing preoperative assessment. This simple intervention improved risk scoring from fewer than 50% of 109 patients included in the Perioperative Quality Improvement Programme in the year preceding Synopsis IQ™ introduction to 100% in the 10 months after (Gadelkareem and Simpson, 2023; PQIP, 2024).

There are some caveats to perioperative risk prediction tools. By nature, they provide a population estimate of risk based only on the factors included in the risk

Table 1. Examples of quantitative risk scoring tools that can be useful in a patient-centred preoperative assessment model.

Risk scores predicting perioperative organ specific complications
Revised cardiac risk index (RCRI) (Lee et al, 1999) ARISCAT score for postoperative pulmonary complications (Canet et al, 2010) ACS-NSQIP risk calculator (ACS, 2019) EuroSCORE II for postoperative cardiac surgical complications (Nashef et al, 2012)
Risk scores predicting perioperative mortality
SORT and SORT-2 (Protopapa et al, 2014; Wong et al, 2020) ACS-NSQIP (ACS, 2019) Surgical risk scale (Sutton et al, 2002) P-POSSUM (Prytherch et al, 1998) NELA risk scoring tool (NELA, 2014)

Table notes: ARISCAT, Assess Respiratory Risk in Surgical Patients in Catalonia; ACS-NSQIP, American College of Surgeons-National Surgical Quality Improvement Program; EuroSCORE, European System for Cardiac Operative Risk Evaluation; SORT, Surgical Outcomes Risk Tool; P-POSSUM, Portsmouth Physiological and Operative Severity Score for the enuMeration of Mortality and Morbidity; NELA, National Emergency Laparotomy Audit.

tool, and as such they are not fully able to capture the whole complexity of a patient's unique circumstances and operative procedure. It is impossible therefore to tell patients with certainty whether they will or will not suffer a particular complication from their treatment.

However, they are key to SDM as they allow conceptualisation and quantitative communication of perioperative risk and should "be used in conjunction with clinical judgement to aid decision-making and facilitate informed consent" (Protopapa et al, 2014). They also help support post-operative planning. Patients with a predicted 30-day mortality of greater than 1% should be considered for enhanced post-operative care and greater than 5% for critical care (CPOC, 2020).

Shared Decision-Making

SDM involves the patient and multidisciplinary team working together to plan the timing and nature of the patient's healthcare interventions. By understanding what is important to the patient, inappropriate treatment strategies can be avoided, which have been shown to be associated with subsequent patient regret around management decisions (Wilson et al, 2017).

It should involve discussions with the patient that involve 'BRAN': the benefits, risks, alternatives and the option of doing nothing for any given intervention, which will differ for each patient. There are benefits for both patients and clinicians, as SDM approaches have been shown to improve decision quality and reduce conflict around treatment decisions, as well as being associated with a lower frequency of patients opting for elective surgery (Boss et al, 2016). There are resources available for clinicians and patients to support the SDM process, for example, National

Health Service (NHS) England has produced SDM tools which aim to help patients to navigate the wealth of treatment options for their condition based on their own priorities (NHS England, 2024).

This approach is seen in many perioperative clinics for older people undergoing surgery, such as the Perioperative Care for Older People undergoing Surgery (POPS) service, the Colchester Older Person's Evaluation for Surgery (COPES) clinic, and the Perioperative Review Informing Management of Elective surgery (PRIME) service in Cambridge, amongst others (CUH, 2024; Staiger et al, 2023; Stewart et al, 2023). These clinics utilise the expertise of perioperative physicians to support the multidisciplinary team and have a growing wealth of evidence to support their benefits (Lodge et al, 2024). In these clinics, a comprehensive approach is taken including a Comprehensive Geriatric Assessment which includes the patient's medical comorbidities, physical status and activity levels, investigations, and risk assessment tools or exercise testing data, resulting in an SDM process with the patient and a relative (where applicable) about the likely individualised benefits and risks from undergoing a particular surgical procedure (Stewart et al, 2023).

A hypothetical example of a patient who might benefit from such a clinic would be an 85-year-old man with a new diagnosis of colorectal cancer which presented with anaemia, requiring a bowel resection, but also suffering from other comorbidities including ischaemic heart disease, chronic obstructive pulmonary disease, hypertension and hypothyroidism as well as significant frailty with frequent falls and needing daily carers for support with activities of daily living. He would benefit from such a clinic to ensure his anaemia and other comorbidities are optimised, and that he understands the risks of proceeding with surgery including a description of the risks and a quantified risk assessment as well as an explanation of what perioperative care will involve. He would then be in a position to be supported by the clinical team to make the best decision for him about his course of treatment, whether or not he proceeds with surgery.

Measuring Success

Patient-centred preoperative assessment is a complex intervention resulting in a re-design of perioperative pathways. The objectives should be to improve the quality of patient care, to effectively utilise limited resources, and to ensure standardisation so that all patients receive an equal quality of care. Therefore, it is essential to constantly measure key performance indicators (KPIs) of this system to identify areas of weakness and share and develop better practices. Some examples of these are included in Table 2.

Though digitalisation in itself does not make better perioperative pathways, it does facilitate data collection and can therefore aid monitoring of KPIs (van Hoorn et al, 2023). Within appropriate information governance structures, it also aids safe multidisciplinary team information-sharing to support the optimisation and SDM processes. Digitalisation is therefore an essential part of building a patient-centred preoperative pathway.

Table 2. Suggested key performance indicators for a patient-centred preoperative assessment service.

Suggested key performance indicators (KPIs)
Number of patients undergoing early screening and triage
Number of patients identified as 'green' or low-risk at screening
Number of patients referred for optimisation of specific conditions at screening
Number of patients with late postponement of surgery due to need for optimisation
Number of medium-/high-risk patients for whom quantitative risk assessment is performed
Number of patients offered a face-to-face 'high-risk clinic' appointment to discuss care with a perioperative physician/anaesthetist

Challenges in Delivering Patient-Centred Preoperative Assessment

There is a risk with the use of the patient-centred approach of exacerbating healthcare inequalities. Where preoperative assessment systems are digitalised and patients asked to complete screening questionnaires, patients without access to devices or who have difficulty using them may be disadvantaged. Some patients may struggle to engage with shared decision-making, such as those with cognitive impairment, and it is essential that decisions are made in the individual patient's best interest using SDM according to their capacity.

Implementation of patient-centred preoperative assessment needs to fit in with development of information technology (IT) infrastructure and this can be challenging. As providers move towards digital tools for preoperative assessment, it must be ensured that these tools are able to deliver the preoperative pathways required.

With an aging and more comorbid population, it is likely that more patients will fall into the medium- and high-risk groups, requiring greater allocation of resources for risk assessment, SDM discussions, and prehabilitation sessions. This has both a staffing and physical space implication, which many organisations would find challenging to accommodate.

Who Should Deliver This Service?

As we make preoperative assessment more patient-centred we must allocate appropriate staff to roles. Healthcare assistants can deliver 'low-risk' clinics where those on a low-risk pathway need basic tests (e.g., MRSA screening) and standardised information provision. Expert preoperative assessment nurses who have comprehensive knowledge of guidelines might deliver the screening and optimisation as well as face-to-face clinics for medium and higher-risk patients. Meanwhile, experienced clinicians should dedicate their time to conducting SDM discussions and making those clinical decisions where a number of risks and benefits need to be weighed up.

A preoperative assessment clinic cannot operate as an island. It must utilise the other resources around it. This might include community lifestyle services (such as smoking cessation clinics), and community diabetes and heart failure services. It

must forge links with primary care, as ultimately certain chronic conditions must be optimised by a patient's general practitioner (e.g., hypertension), and have good support from other specialties within secondary care, particularly but not exclusively from cardiology and haematology.

Conclusion

The combination of more advanced surgical and anaesthetic practice with patients who are older, frailer, and more comorbid, makes it ever more essential that the right patients undergo the right procedures (after SDM) at the right time (when appropriately optimised). Patient-centred preoperative assessment pathways are now extensively supported by national guidance in the UK to improve the quality of patient care and use limited resources more effectively. Promisingly, developments in preoperative assessment software and systems have the potential to facilitate a more patient-centred approach, if appropriately supported by organisational structures, staffing and multidisciplinary working. This is a field of growing interest and ongoing trials may give more information as to outcome measures from implementing patient-centred preoperative assessment methods.

Key Points

- Patient-centred preoperative assessment should include early screening and triage of patients to low-, medium- and high-risk groups according to comorbidities and type of procedure.
- Optimisation of comorbidities and lifestyle factors can be carried out whilst patients wait for surgery.
- The extent of preoperative assessment and investigation should be tailored to the level of risk to which the patient is assigned.
- Quantitative individualised risk assessment should be used for all medium- and high-risk patients to aid communication with the patient and perioperative planning.
- Shared decision-making and multi-disciplinary working should be incorporated throughout the preoperative pathway.

Availability of Data and Materials

All data included in this study are available upon request by contact with the corresponding author.

Author Contributions

BC and JS designed the review article. Both authors drafted the manuscript. Both authors contributed to important editorial changes of important content in the manuscript. Both authors read and approved the final manuscript. Both authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Not applicable.

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Conflict of Interest

The authors declare no conflict of interest.

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