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Review

Palliative care and the anaesthetist

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Introduction

Anesthesia has long moved from the sole realm of the operating theatre, evidenced through its role in the advent of intensive care medicine in the 1950 and 60s, management of acute and chronic pain, out of hospital trauma management and emergency patient transfer. However, despite familiarity with the predominant symptom concerns at the end-of-life, notably pain and agitation, anesthesia's contribution to palliative care remains limited and increasing participation in the management of the palliative patient though lauded and logical clearly presents practical considerations and ethical concerns for anaesthetists regarding decisions on limiting medical treatment and deep sedation. Greater involvement does not reflect a deficiency of current palliative care practice, rather an opportunity to supplement an essential field with anaesthetic knowledge of sedation, practical skill in neuraxial and regional analgesia, in combination with multidisciplinary communication and a focus on shared decision-making.

Palliative Medicine is a holistic, multi-disciplinary, patient centered approach to the management of symptoms at the end of life. Whilst palliation has historically been focused on terminal malignancy, there is a wide application of palliative disease management and symptom control. The incorporation of palliative care into a specialized heart failure service developed physician knowledge base, enriched challenging consultations and improved symptom-control without increasing palliative care referral burden[1]. With advanced treatment options and minimally invasive surgical techniques there is increasing acceptance that surgery at the end of life is becoming more commonplace[2]. Anaesthetists must be aware of the complexities of the patient at the end-of-life and how to recognize them.

Recognizing the patient who may benefit from palliative care

Anaesthetists interact with patients with terminal diagnoses in wide-ranging clinical environments including pre-operative; peri-operative; and post-operative. The pre-operative encounter presents an ideal opportunity for early, considered discussion around the risks and benefits of intended surgery, and the identification of patients for whom treatment aims should be palliative symptom management, not operative intervention. Risk prediction models input patient-specific data into multivariable models to estimate individual risk probability. Although complex to use in everyday practice they are precise in calculating a patients' individual risk[3]. The weakness of most models is that morbidity is largely omitted or underpowered, despite post-operative morbidity and its deleterious effects on quality of life and independence reported of great concern to both anaesthetist and patient[3]. Most frequently employed risk prediction models to assist complex surgical decision-making in the UK are the Physiological and Operative Severity Score for the enUmeration of Mortality and Morbidity (POSSUM), the Surgical Outcome Risk Tool (SORT), and the American College of Surgeons National Surgical Quality Improvement Project (NSQIP)[3,4]. POSSUM was initially developed using emergency and elective general, urological and vascular procedures in 1991. It has been updated in Portsmouth to the newer risk model P-POSSUM. It provides a predicted outcome of 30-day mortality but does not provide a morbidity predication. It is comprehensive and well-validated, despite having some subjective elements[3]. SORT also provides a 30-day mortality predicted outcome only. It benefits from ease of use with readily available preoperative data points. The American College of Surgeons NSQIP provides multiple procedure-

specific, outcome predictions including: 30-day mortality, 30-day morbidity; return to theatre; readmission to hospital; and risk of discharge to post-acute care facility. Limitations on its use are its data set originating from private American centres restricting is comparability to local patient populations, as well as the time required to complete[3]. Risk stratification tools in isolation are unhelpful, however, when combined with expert clinician assessment and skilled communication they can be effective in demonstrating to patients and families the burden of surgery, facilitating an informed and candid discussion.

Pre-operative preparation and shared decision making

Looking beyond the traditional surgical healthcare outcomes of morbidity and mortality, a goal-orientated approach has been advocated. Goal directed care moves away from treatment of pathology to management of symptoms, improvement of function and quality of life[5]. Deployed within the perioperative care setting it has two objectives, one, to accurately identify patient goals and align them to realistic, achievable outcomes and secondly, to develop a pathway to realize them. Therefore, measurement outcomes of goal-directed treatment are not short-term outcomes such as length of stay and mortality, but patient reported outcome measures and patient reported experience[5]. Goal-directed care can only be successfully achieved by inclusion of patients and family within the decision-making process. Anaesthesia can utilize the time between decision for surgery and admission to scrutinize these goals. Development of robust, anaesthetic led pre-operative high-risk clinics can facilitate collaborative, patient centered discussions in the outpatient setting. This collaborative approach between clinicians and patients is empowered by providing accurate, relevant and comprehensive information[4]. The UK Shared Decision-Making tool, "BRAN", does this by asking four questions: "what are the benefits?"; "what are the risks?"; "what are the alternatives?" and "what if I do nothing?"[6-8]. The objective of shared decision-making is personalized care to fit with patients' needs, expectations and personal goals for health, with the ultimate outcome of improved patient satisfaction[7]. This structure locally has led to an increase in patients, following well informed decision-making discussions, declining major or high-risk surgery in favour of symptom control.

Naturally, when making decisions around interventions at the end-of-life conflict can occur between healthcare professionals, patients and their families. Conflict arises due to failure to understand prognosis, unrealistic expectations of treatment, and principally failure of communication. Where patients have capacity, they can make decisions that clinicians perceive are not within their best interests. However, "a patient cannot demand that a doctor administer a treatment which the doctor considers is adverse to patients' clinical needs"[9]. Van Keer et al found that whilst healthcare professionals viewed "good care" as positive outcomes, patients' family viewed good care as holistic quality-of-life orientated outcomes[10]. Thus, incorporating family where possible to shared decision-making discussions is crucial[11]. Greater challenge occurs when patients lack capacity to participate in discussions. In these scenarios, where advanced directives are not in place, healthcare professionals must primarily act with non-maleficence and beneficence, whilst considering the advice of family on patient preference and quality of life expectations[11].

Peri-operative considerations

The intra-operative period presents the potential for deterioration and requirement for resuscitation. Given the reversible nature of many commonly encountered peri-operative pathologies, do not attempt resuscitation orders have classically been suspended for this period[12]. The Association of Anaesthetists, United Kingdom (UK), have updated guidance reviewing the implementation of advance care plans and the role of do not attempt cardiopulmonary resuscitation (CPR) forms in the peri-operative period, highlighting that after surgical and anaesthetic consideration suspension may be appropriate in many cases[12]. Lee and Ashby describe the implementation of the goals of care (GOC) framework in the perioperative period in Australia, where it has superseded the "not for resuscitation" framework[2]. The GOC framework follows a shared decision-making model where "limitations of medical care" (LOMT) and patient reported GOC are considered within the parameter of the patients' current pathology and illness trajectory. This does not replace any previously detailed advanced care directives (ACD). Principally relating to emergency admissions Lee and Ashby advocate for early discussion and documentation of GOC decisions. When categorizing patient illness, they distinguish between palliative and terminal, where imminent death is expected in terminal and focus of care should be maintained as comfort and dignity. When considering palliative illness, surgery should be contemplated especially if the intended benefit is of symptom relief. As well as

this the legal implications of resuscitation in the peri-operative period, if contrary to prior ACD, and the role of resuscitation in the operating theatre to facilitate a dignified death post-operatively with family in attendance should be considered[2]. Where alteration of the LOMT is implemented, they can be based on techniques, for example defibrillation and chest compressions, or values-based, using patient outcomes as basis for clinician judgement. Crucially, any change to treatment escalation limits and suspension of do not attempt CPR forms should be communicated with the patient, family, and theatre team. The UK has seen increasing use of treatment escalation plans, which document prior shared decision-making conversations and conclusions regarding the likely success of interventions and treatments when a patient is at risk of deterioration or nearing the end of life. Much like the GOC framework, these have assisted in laying the foundation for peri-operative decision-making discussions[12].

Post-operative focus remains on patient-centered goal-directed care. Admission to high-dependency and intensive care units should be considered based on the intended outcome of surgery, with thought given to limits on duration of admission and supportive treatment. A decision regarding the post-operative reinstatement of LOMT and do not attempt CPR forms should be made in the pre-operative phase and actioned following completion of surgery.

Anaesthesiologists and the palliative patient not for operative intervention

The aim of palliative treatment is to alleviate burdensome symptoms, and surgery may not offer any benefit to many patients. Anaesthetists may however still have skills to offer the non-operative palliative patient. Agitation at the end of life is a well-recognized phenomena in the last days and hours of life, with opioids and benzodiazepines routinely employed to good effect. However, symptoms of agitation can be refractory to conventional management, and be distressing to both patient and family. A recognized management strategy is the utilization of propofol infusion, off license, for palliative sedation[13]. Employing a propofol infusion aims to alleviate symptoms of agitation by deliberately inducing a light-to-deep sleep[14]. Whilst common place for anaesthetists, the prescribing of propofol sedation by palliative care physicians and management of infusions on a general medical ward is infrequent. General anaesthesia in palliation was likely first described by Dr John Moyle, Consultant Anaesthetist and Palliative Care Physician, in 1995, who established a protocol for using a propofol infusion for palliative sedation[15]. Moyle endorsed a low-dose, titrated, pump-driven intravenous infusion to avoid the complications of respiratory depression. Multiple publications have proposed the use of propofol at the end-of-life based on the Moyle protocol. The European Association for Palliative Care (EAPC) updated their guidance on palliative sedation, originally developed in 2009, more clearly defining the term suffering as "distressing physical and psychological symptoms as well as states of existential suffering"[16]. The framework advises that no specific timeframe of life expectancy is pre-determined for the use of palliative sedation. The EAPC advocates a pharmacological stepwise approach to sedation with propofol at the top of an escalating ladder which incorporates benzodiazepines and phenothiazine antipsychotics[16]. A prospective case series by Lundstrom et al achieved "good" or "very good" symptom control from 20 of 22 patients when a propofol infusion was initiated at 1mg/kg/hr and titrated by 0.5mg/kg/hr, with most patients receiving intended benefit at a rate of 1-2mg/kg/hr[17]. If instituted robust local guidelines must be in place with palliative and anaesthetic physician buy-in. Originally developed for the assessment of sedation in intensive care unit, the Richmond Agitation Sedation scale has been modified for the use in palliative setting and is advocated by the EAPC. The Richmond Agitation Sedation Scale – Palliative version (RASS-PAL) is a reliable assessment method of sedation during propofol palliative sedation therapy (PST). Aims of palliative sedation is symptomatic relief with least sedation necessary. Using a standard tool improves management and communication[18].

Concern regarding the role of general anaesthetics in palliation and the accelerating of death is inescapable. Research is limited, however studies conducted investigating if continuous deep sedation influenced mean survival time found that there was no difference in mean survival time between those who received continuous deep sedation and those who did not[15]. The EAPC statement highlighted the legal differences and healthcare frameworks across Europe[16]. In the United Kingdom assisted dying is currently illegal, with both the UK and Scottish parliaments currently debating the moral and ethical arguments of their respective proposed legislation related to the end-of-life process for terminally Ill adults[19,20]. Becoming the first country to legislate in this area, in 2016 France introduced the right to continuous deep sedation at the end of life for patients who decline life-sustaining treatment[21]. It has been

deemed the "French exception" and is a form of symptom control for intractable suffering at the end of life. To avoid concerns regarding the hastening of death the French guidance recommends that propofol terminal sedation be limited to the last 14 days of life. It is also a requirement in cases where capacity has been lost, and physicians have decided to withdraw life sustaining treatment[21]. Complications can present when the patient does not pass within the timeframe of two weeks set out by the guidance[15]. Whilst some argue this empowers patients to die with dignity others argue this blurs the moral boundary between symptom control and euthanasia[21], however even the conservative Catholic church has recognized the doctrine of double effect. Most European jurisdictions currently recognize a distinction between an 'act' and an 'omission' and as such withholding medical intervention even if this hastens death is permissible in certain situations; this moral and legal stance has allowed what could easily be described as "passive euthanasia" and does form part of the recognized "duties of a doctor" when ensuring that patients are not subject to interventions or treatment which they do not wish or are of no benefit to them.

Anaesthesiologists, pain and palliation

In the palliative population, cancer pain is a complex issue and tailored pain management is essential for every patient[22]. More than 50% of cancer patients experience pain during treatment while 30% suffer pain during remission[23]. Despite successful treatment from an oncological perspective, 10-40% of cancer survivors report moderate to severe pain, significantly impacting their quality of life[24,25].

Apart from oncological and surgical techniques, non-operative methods like interventional and pharmacological therapy are viable for patients with cancer pain. However, even with optimized systemic analgesia, 10% of adult cancer patients fail to obtain sufficient pain relief[26]. In one study, a similar number (11%) of patients in hospice settings were considered for interventional therapy[27]. Interventional pain management can be utilized in situations such as cancer pain refractory to opioid analgesia and patient's intolerant to systemic opioids.

The goal of interventional cancer pain management is to disrupt the transmission of nociceptive signals at various stages from the periphery to the cortex to attain sufficient pain relief[28]. Interventional cancer pain management can be categorized into central blocks and peripheral blocks. Within central blocks techniques, neuromodulation methods include intrathecal drug delivery while neuroablative methods comprise percutaneous and open cervical cordotomy[22]. These techniques are most effective when integrated within a multidisciplinary and personalized care approach[28]. While the general anaesthetist will not necessarily be able to perform them, it is vital that they are aware of these options when confronted with palliative patients for whom other intervention or of no or dubious benefit.

Intrathecal drug delivery in cancer pain

Intrathecal Drug Delivery (ITDD) involves direct administration of an analgesic into the cerebrospinal fluid in the intrathecal space around the spinal cord[28]. There are two types of drug delivery systems: fully external systems involving a tunneled or non-tunneled catheter with an external pump; and fully implanted versions with the pump installed in the superolateral quadrant of the buttock or the anterior abdominal wall. Morphine, levobupivacaine, hydromorphone or ziconotide are the most commonly agents used in ITDD, and they are used in combination to promote better analgesic effects[29,30]. Published data demonstrates statistically significant reduction in pain score over 6-month period for patients with difficult-to-control cancer pain attending the multidisciplinary interventional cancer pain service offered by The Beatson West of Scotland Cancer Centre[30]. A fully implanted system is beneficial when the infusion rate is low, and it is associated with low incidence of infection compared to fully external systems for longer term usage[28]. ITDD is less useful when the pain is more widespread[28]. The effective opioid dose in ITDD is reduced to 1/300 of the equivalent oral dose, cutting the risk of systemic drug toxicity as well as adverse side-effects. Moreover, there is the long-term advantage of pain control that can be sustained in various care settings such as hospices or the patients' home with the help of multidisciplinary team input[30].

Percutaneous cervical cordotomy

Percutaneous Cervical Cordotomy (PCC) is a technique recommended to control intractable unilateral cancer pain in patients suffering from cancer-related pain occurring below the fourth cervical dermatome[26]. Typical indications include costo-pleural syndrome in malignant pleural mesothelioma; however, it can also be applicable to any unilateral pain below the level of the clavicle. Bilateral PCCs are generally not performed due to the risk of bilateral reticulospinal tract disruption and consequently Central Hypoventilation Syndrome (Ondine's curse). PCC works by removing pain and temperature sensation on one side of the body below the clavicle through disruption of the contralateral spinothalamic tract[26].

The sensory pathways of the lateral spinothalamic tract are most commonly ablated using radiofrequency thermocoagulation under fluoroscopic or commuted tomography guidance[26,31]. PCC is typically recommended to patients with life expectancy estimated to be <12 months[32]. This is due to the risk of developing neuropathic pain such as deafferentation pain, mirror pain and dysesthesia in those surviving years after the procedure. Careful patient selection is therefore imperative[26].

PCC typically achieves high effectiveness among patients. As many as 83% of patients who undergo the procedure reduce their opioid consumption by half[33] and almost 40% stop taking opioids entirely[34]. However, PCC is contraindicated in patients with coagulation disorders, significant respiratory insufficiency, or inability to lie still[26]. It is difficult to pinpoint definitive complication rates of PCC as they are performed in a significantly frail cohort with declining health[26]. That said, serious complications due to the procedure are minimal in experienced hands and in case series, life-threatening complications are rare. Minor side-effects such as headache in C2 distribution, early mirror pain that resolves spontaneously, temporary weakness and mild dysesthesia are common[26].

Other regional blocks potentially useful in palliation

Apart from central techniques like ITDD and PCC, peripheral block techniques such as somatic and visceral blocks also form part of the interventional techniques available for cancer pain management. Somatic blocks work by targeting peripheral nerves or plexi such as the brachial or lumbar plexus, paravertebral, or intercostal nerves. Visceral blocks work by alleviating pain through the autonomic nervous system which includes both sympathetic and parasympathetic nerves such as coeliac plexus blocks, superior hypogastric plexus blocks and ganglion impar blocks. In these blocks, local anaesthetic, possibly combined with steroids, can be administered around nerves to induce a temporary conduction block and alleviate pain[28]. Neurolytic blocks can be used with neurodestructive injectates such as phenol or anhydrous alcohol.

Coeliac plexus block is widely indicated for upper abdominal cancer pain, and it can achieve 70-80% success rate in pain relief for pancreatic cancer patients[35]. Contraindications comprise patient refusal, local or systemic sepsis, and bleeding diathesis. General complications include vessel injury depending on approach used, significant hypotension due to sympathetic blockade, uncommonly infection, and rarely, paraplegia due to arterial injury or neurolytic spread[36].

Superior hypogastric neurolytic block can be utilized to ease pain from pelvic structures[37]. It is also used to treat benign pelvic pain such as endometriosis. This technique has similar approach to the coeliac plexus block but with different target location of application[38].

The Ganglion impar block is used to manage perineal, anorectal, and lower pelvic pain caused by local malignancy in the context of cancer pain. When carrying out this block, a needle is advanced through the sacrococcygeal joint to reach the ganglion that lies within the precoccygeal space. Complications in addition to those above include a rare but possible risk of rectal perforation due to its anatomical proximity[28].

Conclusion

Anaesthesia is advancing out of the operating theatre and can be a crucial companion to palliative care of the terminal ill patient. An integrated, comprehensive, and patient centered approach is crucial and best achieved through thorough multidisciplinary assessment incorporating Anaesthesia, Pain Medicine, Palliative Medicine, Psychology, Nursing and Physiotherapy input. This holistic approach ensures that patients receive the highest quality of continuous and coordinated care. Anaesthetists have transferable skills and knowledge which can help the palliative patient and improve their care; care which may not always include an operation but will always ensure that they are empowered to face death in a way which puts them in best control of their disease, their symptoms and their last most precious time on this earth.

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