Implications of postoperative cognitive decline for satisfaction with anaesthesia care

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Editor—Patient satisfaction with anaesthetic care is an important quality metric and may be increasingly tied to payment for services as it has been in other disciplines. Patient-reported outcomes and the development of complications have a strong impact on short-term global patient satisfaction (e.g. 30–90 days after surgery).[1] Before elective surgery, older adults report patient-centred outcomes, such as instrumental activities of daily living (IADL), which are explicitly or implicitly cognitive in nature, as highly valued.[2] Postoperative neurocognitive disorders, specifically postoperative delirium and postoperative cognitive dysfunction (POCD), are common adverse events after anaesthesia and surgery.[3] Both are associated with loss of IADLs postoperatively and other medical complications.[4,5] The extent to which patient satisfaction with anaesthesia care is affected by postoperative neurocognitive complications is unknown. To understand what factors drive patient perception of their anaesthesia care, we analysed a prospective cohort of older adults undergoing major noncardiac surgery. Our hypothesis was that postoperative neurocognitive disorders are associated with lower satisfaction with anaesthesia care at 3 months postoperatively.

The cohort of older adults from which this sub-study was derived has been described.[4] Briefly, the parent study included 167 older adults who underwent elective surgery and gave informed consent to participate in a longitudinal study of postoperative cognition, which was approved by the Mount Sinai Institutional Review Board. There were 150 participants available for 3-month follow-up that we analysed. The participants underwent a battery of validated instruments to measure pain (Geriatric Pain Measure), anxiety and depressive symptoms (Hospital Anxiety and Depression Scale), and cognition. Postoperative delirium was assessed using the Confusion Assessment Method for the ICU (CAM-ICU) method, and complications using the Sokol and Wilson[6] definition.

The cognitive testing battery included Trails A and B, Digit Span Forwards and Backwards, Wechsler Adult Intelligence Scale, Logical Memory Story A, Immediate and Delayed Recall, Animal and Vegetable Lists, Boston Naming, and the California Verbal Learning Test. Cognitive scores were normalised to baseline performance using *z*-scores, and, *a priori*, those with an average (across all tests) decline of 1 or more standard deviations were defined as having POCD,[4] aligning with the objective cognitive testing threshold for mild neurocognitive disorder.[7]

To measure 3 month satisfaction with anaesthesia care, the participants were asked, 'Which description do you believe most accurately describes to what extent you were satisfied with the anaesthetic care you received?' The participants selected 'totally satisfied', 'satisfied', 'moderately satisfied', 'somewhat satisfied', or 'not at all satisfied'. Aligning with an approach used elsewhere,[1] we dichotomised participant satisfaction into 'totally satisfied' and 'less than totally satisfied'. Subjective cognitive decline was elicited with the question, 'Which description do you believe most accurately describes to what extent your surgical procedure has negatively affected your clarity of thought now, compared with before your surgery?' The participants selected 'not at all', 'minimally', 'moderately', 'severely', and 'completely'. Any answer other than 'not at all' was considered to represent subjective cognitive decline.

We analysed univariate associations with $\chi 2$ tests or Fisher's exact test when predicted cell frequencies were <5. *A priori* co-primary outcomes were postoperative delirium, POCD, and the subjective perception of cognitive decline at 3 months after surgery. Secondarily, we examined associations between satisfaction and depression, anxiety, and pain, and with more traditional surgical complications.[6] We considered a $P<0.05$ to indicate statistical significance without Bonferroni adjustment because of the strong underlying hypothesis that the outcomes would not be independent.

At 3 months after surgery, 122 of 150 patients (81%) reported being totally satisfied with their anaesthetic care. Of the 28 who were not totally satisfied, 16 (57%) were satisfied, four (14%) were moderately satisfied, five (18%) were somewhat satisfied, and three (11%) were not at all satisfied.

We found no association between postoperative delirium or POCD and reporting of less than total satisfaction. However, participants who reported subjective cognitive decline were significantly more likely to be less than totally satisfied with their anaesthetic (subjective decline: 39% of not totally satisfied; 12% of totally satisfied; $P=0.002$). Participants who were unsatisfied with anaesthetic care were also significantly more likely to have depressive symptoms after surgery (25% *vs* 8%; $P=0.020$), but not anxiety. Surgical complications and pain inventory 3 months after surgery had no statistically significant effect on anaesthetic satisfaction (Table 1).

We show that, in this cohort of older adults undergoing elective surgery, subjective cognitive decline and depression are associated with lower satisfaction with anaesthesia care. However, there was no association between POCD or delirium and satisfaction with anaesthesia care, although they are associated with loss of independence in older adults.[4,5] Whilst objective markers of anaesthesia care (e.g. survival or acute

Table 1 Cohort description and 3 month postoperative outcomes *vs* 3 month satisfaction with anaesthesia care. *Wilcoxon–Mann–Whitney rank test. †χ^2 test. ‡Fisher's exact test. ¶Postoperative complications were ascertained according to the Sokol and Wilson[6] definition: an 'undesirable, unintended, and direct result of an operation… which would not have occurred had the operation gone as well as could reasonably be hoped'. §Geriatric Pain Measure (pain inventory) >30, indicating moderate-to-severe pain. APR-DRG, All Patients Refined Diagnosis Related Group.

		Totally satisfied (n=122)	Not totally satisfied (n=28)	P-value
Cohort description				
Age (yr)		70 [67, 74]	73.5 [69, 75]	0.049*
Female sex		69 (57%)	14 (50%)	0.53†
Baseline Geriatric Pain Measure		39.3 [11.9, 66.6]	41.7 [4.8, 72.6]	0.76*
ASA physical status	2	45 (37%)	8 (29%)	0.066‡
	3	75 (61%)	17 (61%)	
	4	2 (1.6%)	3 (10.7%)	
Type of surgery	Spine	53 (43%)	13 (46%)	0.66‡
	General	38 (31%)	6 (21%)	
	Urological	20 (16%)	5 (18%)	
	Thoracic	11 (9%)	4 (14%)	
APR-DRG risk of mortality	Minor	74 (63%)	9 (33%)	0.012‡
	Moderate	36 (31%)	17 (63%)	
	Major	7 (6%)	1 (4%)	
	Extreme	1 (1%)	0	
Postoperative course		Totally satisfied	Not totally satisfied	
Experienced a complication¶		53 (43%)	13 (46%)	0.77†
Postoperative delirium		29 (24%)	9 (32%)	0.36†
3-month outcomes		Totally satisfied	Not totally satisfied	
Postoperative cognitive dysfunction		20 (16%)	3 (11%)	0.57‡
Subjective cognitive impairment		15 (12%)	11 (39%)	0.002‡
Depression		10 (8%)	7 (25%)	0.020‡
Anxiety		15 (12%)	5 (18%)	0.54‡
Moderate-to-severe pain§		52 (43%)	11 (39%)	0.75†

kidney injury) are important to study, patient-centred outcomes drive patient satisfaction and are not consistently collected in older surgical patients.

There are important limitations to consider when interpreting this work. Older adults in this study gave informed consent to participate in a study of anaesthesia and postoperative cognitive decline; therefore, their responses may be biased (i.e. primed) towards reporting dissatisfaction with anaesthetic care when their perceived or actual cognition has declined from baseline. Whilst the lack of association between surgical complications and satisfaction with anaesthesia care is reassuring, we cannot eliminate the possibility that reported anaesthesia satisfaction may reflect a patient's experience with other elements of the hospital stay. The CAM-ICU instrument used to detect delirium may have decreased sensitivity in non-ICU patients, although the overall rate (25%) is consistent with other studies of older adults. Further, this study also recruited a sample that consisted of subjects who were predominantly of higher education and socio-economic status; thus, generalisability is unclear.

In conclusion, subjective cognitive decline and presence of depressive symptoms are strongly associated with less than total satisfaction with anaesthesia care. We showed discordance between objective postoperative neurocognitive disorders (not reliably linked to subjective cognitive complaints)[8] and satisfaction with anaesthetic care. Whilst objective cognition is important for functional recovery, capturing data on subjective predictors of recovery is important for appreciating opportunities to improve overall patient experience. Our findings support the importance of geriatrics-focused collaborative initiatives to widen the lens of anaesthesiologists' perioperative care.

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Declarations of interest

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Ketamine for neuropathic pain: a tiger that won't bite?

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Editor—Neuropathic pain, a description associated with a defect in the somatosensory nervous system, is characterised by specific symptoms including burning, electric or shooting pain, hyperalgesia, and allodynia.[1] Hyperalgesia, allodynia, or both are signs of central sensitisation, a state in which there is an exaggerated response of nociceptive neurones to normal or subthreshold stimuli – that is a gain in function in relation to nociceptive stimuli.[2] Irrespective of aetiology, neuropathic pain is difficult to manage, and consequently has a large impact on patient quality of life and ability to participate in common daily activities. Owing to the limited efficacy of common pain treatments (including treatments considered specific for neuropathic pain such as antiepileptic drugs and antidepressants),[3,4] many physicians have adopted the *N*-methyl-D-aspartate receptor antagonist ketamine as treatment for therapy-resistant or refractory neuropathic pain.[5] This is not surprising given the role of this excitatory receptor in the chronification of pain (particularly neuropathic pain) and the ability of ketamine to reduce windup and temporal summation, surrogate measures of central sensitisation.[6–8] Still, proof for use ketamine in neuropathic pain from RCTs is limited.

We and others have recently performed narrative and systematic reviews of RCTs that examined the efficacy of ketamine in a variety of neuropathic pain conditions.[9–14] Jonkman and colleagues[10] summarised most recent systematic reviews on ketamine treatment in acute and chronic pain, noting the large heterogeneity of included randomised trials and the number of studies that were of lower quality and often underpowered. The general conclusion from these reviews is that efficacy of intravenous ketamine in neuropathic pain is small and lasts no longer than 1–2 days. Efficacy was even less for other administration routes (oral, intranasal, subcutaneous). These results are in contrast to open-label studies and retrospective case series that show efficacy of ketamine in pain (including neuropathic pain).[12,15] The results of these non-randomised observational and experimental studies support the practice of clinicians who treat patients with ketamine.

An important question is why is there such a large disconnect between RCTs on ketamine efficacy in neuropathic pain and the observation that ketamine is effective in clinical practice as reflected in the outcomes of open-label studies and case series. The answer is not easy, but we will share some of our ideas that may, to some extent, explain the disconnect.[10–12] First, we would like to emphasise a statement made by MacKintosh[15] regarding the use of ketamine for cancer and neuropathic pain: that lack of evidence on ketamine efficacy in cancer pain is not the same as lack of benefit, but a lack of evidence of benefit. We agree and argue that the lack of evidence may be related to the following issues. Apart from the ketamine dose, duration of treatment is particularly important. Single or short-term infusion regimens (<10 h) have little impact on the relief of neuropathic pain. Only when infusion duration exceeds 10 h can sustained pain relief be expected.[9] This probably relates to a ketamine-induced chemical reset of central pain pathways that requires sustained blockade of the *N*-methyl-D-aspartate receptor.[16] In most RCTs, the ketamine dose is fixed and often relatively low to limit psychomimetic side-effects. In clinical practice, ketamine dose is regularly titrated up or down to patient need and co-medications (e.g. benzodiazepines) or co-analgesics (e.g. α_2-agonists), all aimed to optimise pain relief while reducing side-effects.

Use of pain intensity scores as an outcome parameter may be unrealistic. Chronic pain patients have difficulty scoring their pain on the 11-point numerical rating scale or on visual analogue scales,[17] and it is questionable whether the beneficial effects of ketamine are captured within this pain discriminatory dimension. Ketamine may improve the mood state of the patient, causing improved physical and emotional capabilities without directly improving pain intensity.[11] A better approach would be to query patient satisfaction with treatment and adapt the dose using this endpoint.