

General anaesthesia in elderly ophthalmic patients: is it possible to reduce opiate/sedative exposure as surrogate markers for GA-related delirogenicity?

A retrospective analysis of ophthalmic-surgical patients in opioid-reduced, EEG-guided combined anaesthesia (GA + sub-Tenon's block)

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INTRODUCTION

With current demographics more elderly and frail patients are undergoing anaesthesia in ophthalmic surgery (OS). The choice of anaesthesia is challenging due to its inherent potential to cause postoperative delirium (POD) and cognitive dysfunction (POCD), the incidence of which is especially high in an elderly patient population. Risk for POD and POCD may be lower with regional (RA) as opposed to general anaesthesia (GA) techniques, but limiting anaesthesia to "regional" is not always possible in OS. The current practice is to operate patients with severe dementia under GA lest abrupt movements lead to perioperative complications. A procedure's duration and complexity further limits the application of RA techniques. With GA unavoidable, efforts to reduce the risk of POD/POCD by limiting the exposure to the delirogenic medications may prove beneficial. EEG-monitoring estimates depth of unconsciousness, allowing titration of Propofol. Dexmedetomidine as an anaesthetic-sparing agent facilitates opioid-free anaesthesia with the use of RA.

The cumulative dose of anaesthetic agents used may serve as a surrogate for POD/POCD-likelihood. Lower anaesthetic exposure has been associated with a decreased risk for POD/POCD.

METHODS

We retrospectively analysed electronic files from patients >50y in our anaesthesia-information system undergoing OS at high intraoperative

risk when insufficiently sedated: i.e. vitreo-retinal, corneal transplant and traumatic „open-sky“ procedures. According to the anaesthesia modality administered, four distinct groups were designated:

- 1) **TIVA** – „Normal Propofol-Remifentanyl TCI“ without EEG-monitoring, (n=43)
- 2) **TIVA+EEG-guidance**, (n=12)
- 3) **TIVA+EEG+STB** (n=15)
- 4) **Prop-Dex-TCI+EEG+STB** (n=19)

We screened 132 electronic files of patients undergoing the "high-risk" ophthalmic surgeries. Criteria for exclusion were breaches in documentation of dose, EEG values or diversion from anaesthesia protocol. To compare infused amounts of Propofol, we divided the overall sum in mg by the product of body surface area (Dubois) and infusion duration in minutes (Propofol BSA Index). For patients in the groups receiving Remifentanyl, we divided the overall sum in mg by the product of body weight and infusion duration. Tapering Propofol infusion or the ability to stop using opioids are perceived to be surrogate-signals for a reduction in „delirogenicity“. Statistical analysis was performed with R (The R Foundation) by using Linear Mixed Effect Model Regression and Likelihood Ratio Test.

RESULTS

Baseline characteristics are shown in table 1. Group heterogeneity in age, preexisting dementia and C2-intake reflect the practice of our team administering opioid-free + STB anaesthesia preferentially to old, frail

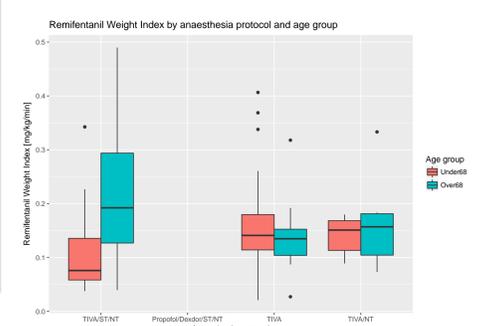
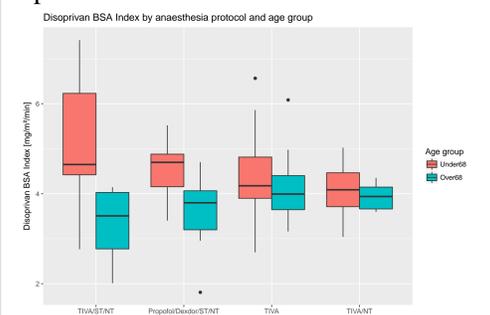
patients. The opioid-reduced group showed faster emergence (9 min) after displaying the lowest Narcotrend-indexes. This group also received the lowest total of Propofol in mg/m²/min while not receiving Remifentanyl and the smallest boluses of Fentanyl. The rates of intraoperative unrest were comparable. The only emergence delirium in the opioid-reduced/Dexmedetomidine-Propofol group was a patient delirious with alcohol delirium tremens.

	TIVA/ST/NT	Propofol/Dexdori/ST/NT	TIVA	TIVA/NT
n	15	19	43	12
Age (Mean (SD))	62.73 (11.96)	75.11 (12.84)	67.16 (9.04)	70.67 (10.20)
Weight (Mean (SD))	91.67 (32.75)	77.42 (14.75)	78.07 (13.33)	72.83 (10.90)
Size (Mean (SD))	1.77 (0.09)	1.72 (0.14)	1.71 (0.10)	1.66 (0.08)
Duration (Median [IQR])	120.00 [103.50, 133.00]	100.00 [85.50, 117.00]	103.00 [91.50, 120.50]	93.50 [86.00, 120.75]
Disopripran mg/m ² /min (Median [IQR])	4.45 [3.87, 5.96]	3.96 [3.45, 4.54]	4.12 [3.82, 4.54]	4.03 [3.61, 4.22]
Remifentanyl mg/kg/min (Median [IQR])	0.08 [0.06, 0.19]	–	0.14 [0.11, 0.17]	0.15 [0.10, 0.18]
Fentanyl µg/kg (Median [IQR])	2.33 [1.96, 2.76]	1.05 [0.94, 1.39]	3.08 [2.35, 3.49]	3.27 [2.28, 3.51]
Dexmedetomidine µg/kg (Median [IQR])	–	0.41 [0.27, 0.87]	–	–
Median Narcotrend Index (Median [IQR])	40.50 [30.75, 51.25]	26.00 [23.50, 30.50]	–	35.00 [31.00, 38.00]
Intraoperative unrest (%)	2 (13.3)	2 (10.5)	4 (9.3)	0 (0.0)
Emergence (Median [IQR])	11.00 [7.00, 15.00]	9.00 [7.00, 12.00]	13.00 [9.00, 17.00]	10.00 [7.50, 11.00]
Wake up delirium (%)	1 (6.7)	1 (5.3)	0 (0.0)	0 (0.0)
Preexisting dementia (%)	2 (13.3)	4 (21.1)	1 (2.3)	0 (0.0)
Preexisting abuse (%)	2 (13.3)	4 (21.1)	7 (16.3)	2 (16.7)
Surgery group (%)				
Both	0 (0.0)	2 (10.5)	5 (11.6)	0 (0.0)
Corneal	2 (13.3)	6 (31.6)	13 (30.2)	7 (58.3)
Other	0 (0.0)	0 (0.0)	3 (7.0)	3 (25.0)
VR	13 (86.7)	11 (57.9)	22 (51.2)	2 (16.7)
Initial airway (%)				
LMA	7 (46.7)	18 (94.7)	16 (37.2)	4 (33.3)
Tube	8 (53.3)	1 (5.3)	27 (62.8)	8 (66.7)

Table 1: Baseline characteristics

CONCLUSIONS

Our data suggests that abandoning/significantly reducing opioid administration in patients >70 years is safe when combining with STB & EEG and even allows reduction of cumulative Propofol administration. With all reservations stemming from a retrospective approach this opens many interesting questions. Further research ought to shed light on levels of unconsciousness considered to be sufficiently "deep" to protect patients from moving, coughing, straining. More discussion is needed to define which phases of surgery demand deepest levels of unconsciousness and for which lighter sedation is acceptable. Combining GA and RA will ask for a new chapter of scientific scrutiny concerning retinal and optic nerve hemodynamics to be opened.



LITERATURE

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