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LETTER

If the Price is Right? Cost Analysis of Propofol Infusions and Sevoflurane Anaesthesia in Endoscopic Cases

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Abstract:

The environmental superiority of Total Intravenous Anaesthesia (TIVA) compared to inhaled agents has been recognised by ANZCA in a 2019 statement. Yet what about cost? Little current data has been published on this topic. We conducted a cost analysis and audit of propofol use in 71 endoscopy cases (colonoscopy/gastroscopy), taking into account the cost of adjuncts (syringes, tubing, and discarded propofol). We then compared these to calculated costs of the same cases performed with sevoflurane anaesthesia. In terms of the agent, propofol was 35% cheaper, costing $1.60 for an average endoscopy compared to a sevoflurane cost of $2.46. Including the cost of adjuncts (including a laryngeal mask airway for sevoflurane anaesthesia), endoscopy cases with propofol infusions were 80% cheaper than the same case performed under sevoflurane general anaesthesia ($3.08 *vs* $15.48). Although pricing may vary from hospital to hospital, our data suggests choosing propofol costs less in endoscopy.

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The environmental superiority of Total Intravenous Anaesthesia (TIVA) compared to inhaled agents has been recognised by ANZCA in a 2019 statement [1]. Yet what about cost?

Little current data has been published on this topic. 55.5% of respondents to a 2018 survey by Lim *et al.* thought that TIVA was more expensive than inhaled anaesthesia [2]. A 2018 international survey by Wong *et al*. showed that cost was a barrier for 28% of infrequent TIVA users [3]. In response, Lam & Ng published findings of a cost analysis from 2016. Contrary to previous publications, they showed that TIVA was in fact cheaper than low flow inhaled anaesthesia [4]. Their results provide a much-needed update on one factor influencing the choice of anaesthetic technique: cost. We wondered whether the findings were reproducible outside their centre.

In our institution, anaesthesia for endoscopy (colonoscopy and/or gastroscopy) is delivered through a propofol infusion targeting deep sedation (often requiring simple airway support), or through sevoflurane inhalation via a laryngeal mask airway with full general anaesthesia. To determine which choice was more economical, we conducted a 2020 cost analysis and audit of this population.

We audited 71 cases, taking into account the cost of syringes, extension tubing, and propofol (used and discarded). Drug and equipment pricing was obtained through the hospital ordering system and correspondence with the hospital pharmacy. We found that an average endoscopic case spent $1.59 on propofol. Including adjuncts cost $3.08 for 33 minutes of procedural time. An hour of propofol infusion cost $4.45.

Figures were compared to calculated inhaled anaesthesia costs, based on Dion's formula and ideal fresh gas flows for induction and maintenance [5]. The cost of sevoflurane for 1 case was $2.46. When Laryngeal Mask Airway (LMA) price was included, a typical endoscopy case maintained at 1 MAC cost $15.48 at a fresh gas flow of 1L - more than 5 times the infusion cost. 1 MAC-hour cost $16.64 (Table. **1**).

Our data would suggest that choosing propofol for endoscopy costs slightly less and saves 35% ($0.86) per case. When costs of adjuncts are taken into account, the differences are far more significant - the same case done with inhaled anaesthesia costs over 5 times as much. On a typical list of 10 colonoscopy cases, this equates to saving $124. Our study addresses a gap in the literature on the costs of infusion. We acknowledge its limitations as a single centre study with relatively modest sample size. There are also limitations as we have not captured data on any possible differences in different recovery times or staff workload. It also occurs occasionally that patients require LMAs during infusion cases for airway support. In this instance, the cost-benefit is minimized to $ 1.32.

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Table 1. Costs of propofol infusion and sevoflurane inhaled anaesthesia for an average endoscopy case and 1 hour.

Cost (AUD)				
-	33 Minutes*	Adjuncts Included**	1 hour	Adjuncts Included
Propofol Infusion***	1.60	3.08	2.88	4.45
Sevoflurane (2% at 1L FGF)****	2.46	15.48	3.62	16.64

*33.38 minutes = average case length in the audit.
**Adjuncts = extension tubing, syringes for TIVA. Laryngeal mask airway for inhaled anaesthesia = $12.35.
*** Average volume/case propofol used = 29.7 ml (average discard volume = 12 ml). Propofol cost $ 0.0335/ml|$ 0.042/ml for 20 ml|50 ml vials respectively.
**** Sevoflurane cost $0.4/ ml. 200 mg propofol induction included in the cost of adjunct. FGF = fresh gas flow.

It is reasonable to expect small differences in costs across centres based on variations in pricing, and not all centres use propofol infusions for endoscopy. However, our study supports the notion that propofol infusions are not just environmentally friendly but also the cost-effective choice in endoscopy.

CONSENT FOR PUBLICATION

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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