



## Oral anxiolytics prior to routine resident cataract surgery eliminate need for intravenous sedation at a Veterans Affairs Hospital

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### ABSTRACT

**Purpose:** To assess the frequency of intraoperative intravenous sedation administration during routine resident-performed cataract surgery among patients receiving pre-operative oral sedation at a Veterans Affairs Medical Center and its impact on patient safety and system cost.

**Methods:** Retrospective review of all resident-performed cataract surgeries performed at the Iowa City Veterans Affairs Medical Center in 2013 and 2017. Cases monitored by a registered nurse were included. Combined cases and cases monitored by an anesthesia provider were excluded. Pre-operative placement of an intravenous (IV) catheter, administration of intra-operative IV sedation, oral diazepam administration, anesthesia type, conditions for administering intraoperative IV medication, and cost of IV catheter placement were recorded.

**Results:** Of 1025 patient cases included for analysis, 972 received pre-operative diazepam (94.9%) and 1017 (99.3%) had IV catheters placed. One patient received a planned dose of IV methylprednisolone. Zero patients received supplemental intraoperative IV sedation. The estimated materials cost of unused IV catheters was \$10,668 over 2 years.

**Conclusions:** Pre-operative IV catheter placement may not be necessary in patients undergoing routine resident cataract surgery with pre-operative oral sedation. Discontinuation of routine IV placement may improve patient satisfaction and decrease health care costs without compromising patient safety.

### 1. Introduction

Recent authors have suggested that there is little to no advantage to intravenous (IV) sedation over oral sedation in patients undergoing routine cataract surgery.<sup>1,2</sup> Citing increased cost savings,<sup>2,3</sup> decreased rate of medical complications,<sup>4</sup> less undesired patient movement,<sup>2</sup> and non-inferior patient satisfaction<sup>1</sup> associated with use of oral rather than IV sedation for routine cataract surgery, they argue that pre-operative IV placement may be unnecessary in low risk cases.<sup>1</sup> Despite the significant potential impact of evolving sedation practices on cataract surgery in the Veterans Health Administration (VHA), literature on sedation use in resident performed cataract surgery at the VHA is sparse.<sup>5</sup>

At the Iowa City Veterans Affairs Medical Center almost all patients undergoing routine cataract surgery receive pre-operative oral diazepam alone with no IV medication. Oral diazepam is chosen because it improves patient comfort and decreases patient anxiety with limited safety risk, it is easily administered by nursing staff, and because it is

relatively low cost.<sup>6</sup> Use of peri-operative sedation is in line with practice patterns in the United States, though routine cataract surgery often may be performed without sedation in other countries.<sup>7</sup>

Registered nurses monitor nearly all routine cataract surgery cases (nurse monitored care). Less frequently, certified registered nurse anesthetists and/or anesthesiologists (monitored anesthesia care, MAC) provide higher level monitoring and sedation as indicated for patients with high levels of anxiety or with significant systemic illness. We observed that peripheral IV catheters are placed in nearly all patients prior to routine nurse monitored cataract surgery but are almost never used. This study assessed the frequency of intraoperative IV sedation administration during routine resident-performed, nurse monitored cataract surgery, and the impact of IV catheter placement on patient safety and cost to the Veterans Affairs (VA) system.

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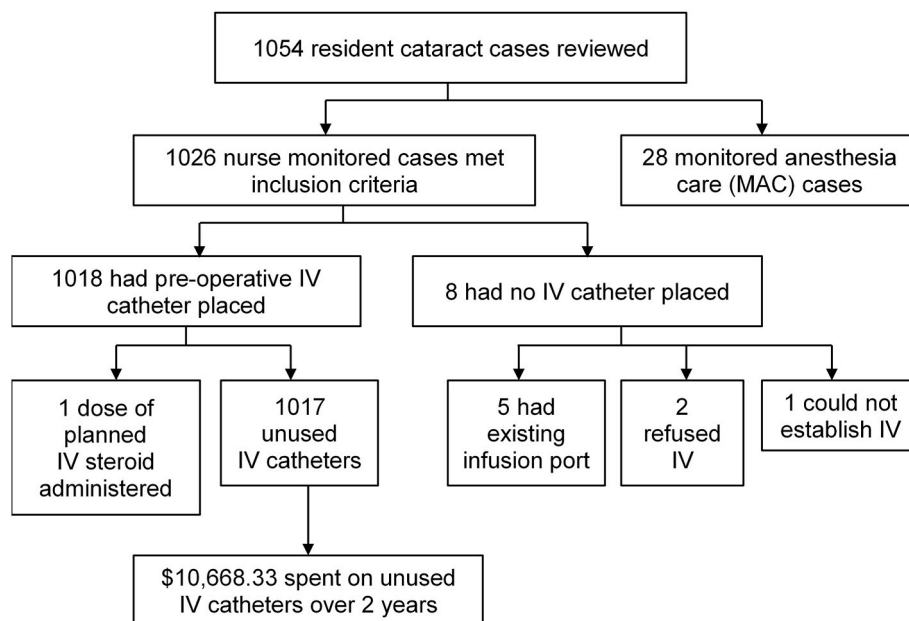


Fig. 1. Primary resident cataract surgery cases reviewed in 2013 and 2017.

## 2. Materials and methods

This retrospective study was performed as part of an ongoing quality improvement initiative at the Iowa City Veterans Affairs Medical Center (ICVA) assessing the frequency of intraoperative IV medication administration in resident-performed cataract surgeries. All cataract surgeries performed at the ICVA in 2013 and 2017 were reviewed. The years 2013 and 2017 were chosen as part of a larger quality improvement study investigating the effect of intraoperative techniques introduced at the ICVA between 2014 and 2016 on patient safety during resident-performed cataract surgery.

All cases performed with an ophthalmology resident as the primary surgeon were included. Cases performed with MAC and those done in conjunction with other procedures (e.g. glaucoma surgery) were excluded. During MAC cases, a nurse anesthetist provided direct intraoperative care under the supervision of a board-certified anesthesiologist. In nurse monitored cases, a registered nurse monitored the patient's intraoperative vital signs and administered supplemental oxygen and/or intravenous sedation as needed at the direction of the attending surgeon.

The primary outcome measure was need for supplemental intraoperative IV sedation. Preoperative IV placement, oral diazepam administration, anesthesia type (topical or retrobulbar), surgical time, intraoperative IV medication administered, and conditions for administering intraoperative IV medication were recorded. Patients receiving pre-operative oral sedation were administered diazepam 0.5 mg 30 min prior to surgery. All patients were administered topical anesthetic drops before surgery and 0.5 mL of preservative-free 1% lidocaine intracamerally through the paracentesis wound at the start of surgery. Patients described as receiving retrobulbar anesthesia additionally received an intracanal injection of lidocaine 2% with bupivacaine 0.75% and hyaluronidase prior to surgery. ICVA Institutional Review Board (IRB) approval was obtained prior to chart analysis. ICVA inventory management calculated the material cost for IV placement to be \$10.49 per case.

## 3. Results

There were 1054 cataract surgery cases reviewed (Fig. 1) over 1 2 years with 1025 nurse monitored cases meeting inclusion criteria. Cases were performed under topical anesthesia (836, 81.6%) or retrobulbar

anesthesia (189, 18.4%) per surgeon preference, with second- and third-year ophthalmology residents as the primary surgeon. Most patients were male (987, 96.3%) with a mean age of 71.4 years. The mean surgical case time was 25.8 min, with a median case time of 24 min (range 8–84 min).

IV catheters were placed pre-operatively in 1017 cases (99.2%) at a material cost of \$10.49 per case to the ICVA. Of the patients who did not have a pre-operative IV catheter placed, 2 patients refused, 5 patients had existing infusion ports, and 1 patient was not able to have IV access established. Nearly all patients (973, 94.9%) received pre-operative diazepam. Zero patients overall received supplemental intraoperative IV sedation. There was no difference in need for supplemental intraoperative sedation between patients receiving topical versus retrobulbar anesthesia. Intraoperative IV medication was administered in one case – a planned dose of methylprednisolone.

## 4. Discussion

This 2-year review of routine nurse-monitored resident cataract surgeries at the ICVA found zero cases that required the administration of supplemental intra-operative IV sedation. Most patients (94.8%), though not all, received pre-operative diazepam. Cases were able to be safely performed without supplemental IV sedation regardless of anesthesia type or resident surgeon skill level.

It has been reported that veterans with a history of post-traumatic stress disorder may require greater intraoperative sedation during cataract surgery,<sup>8</sup> but this was not observed among our patients receiving oral sedation. In fact, 53 cases were performed with no sedation at all. This could be due to a higher anxiety threshold/need for analgesia among this subset patients, as nearly all patients preferred use of a pre-operative anxiolytic.

Of the 1018 peripheral IV catheters placed prior to cataract surgery, 1017 were not used intraoperatively. This study estimated the total cost of unused peripheral IV catheters in uncomplicated resident cataract surgeries to be \$10,668 over two years to the ICVA, not including the time and labor costs of catheter placement and removal by nursing staff. Additionally, patients often complained that the IV catheter placement was one of the most uncomfortable parts of the surgery. Use of oral sedation without IV catheter placement could improve patient satisfaction by reducing discomfort and potentially avoiding the need for

fasting prior to cataract surgery.

## 5. Conclusions

The findings of this study support recent efforts within the field to streamline cataract surgery by considering discontinuation of the routine practice of placing an IV. Peeler et al.<sup>1</sup> suggest that a shift to oral sedation only for routine cataract surgery would not significantly worsen the satisfaction of most patients. We agree and further feel that elimination of routine peripheral intravenous catheter placement for most routine cataract patients would reduce health system costs and would likely improve patient satisfaction without compromising safety.<sup>2</sup>

### Patient consent

Per IRB review, patient consent was not required for this retrospective study. This report does not contain any personal information that could lead to the identification of the patients studied.

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