

# Choosing anesthesia options for cataract surgery in patients with dementia

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## Abstract

**Background and Aims:** Not all patients with dementia are the same, and Global Deterioration Scale (GDS) helps in staging dementia. Ophthalmologists usually prefer general anesthesia (GA) for cataract surgery in patients with dementia. We evaluated the impact of “Choosing Wisely” initiative on anesthesia options for cataract surgery in patients with dementia undergoing cataract surgery.

**Material and Methods:** A retrospective review of electronic perioperative database was performed over a 4-year period of patients with a specific diagnosis of dementia undergoing cataract surgery, after the introduction of the “Choosing Wisely” based on preoperative GDS assessment. Preferred method by the listing ophthalmologist, changes in anesthesia modality based on GDS, and the occurrence of intraoperative events were analyzed.

**Results:** One hundred and thirty-six patients with dementia underwent cataract surgery over a 4-year period. The mean patient age was 78 years, 73.5% female, and 55% ASA physical status III. GA was administered for GDS stage 6–7, and regional anesthesia (RA) for GDS stages 1–5. Surgery was uneventful under RA in 64% of the patients (87 out of 136), and 2% (3 patients) originally deemed suitable for RA were converted to GA.

**Conclusions:** The authors found a reduced requirement for GA when “Choosing Wisely” initiative was used based on the GDS stage.

**Keywords:** Anesthesia option, cataract, choosing wisely, dementia, global deterioration scale

## Introduction

Dementia involves progressive cognitive decline with at least one impaired cognitive domain (language, judgement, or visual perception) sufficient to interfere with social or occupational functioning.<sup>[1]</sup> It is estimated that 24.3 million have worldwide dementia, with 4.6 million new cases every year. The number of individuals affected will double every 20 years to 81 million by 2040.<sup>[2]</sup> This figure is poised to rise by 100% by 2040 in developed countries and is forecasted to exponentially increase by more than 300% in India, China, and their south Asian and Western Pacific neighbours.<sup>[3]</sup>

The diagnosis of dementia is usually made by the psychiatrist or geriatrician. There are several assessment and staging systems for dementia, including the Global Deterioration Scale (GDS).<sup>[4]</sup> GDS comprises seven stages [Table 1], and is one of the recommended tool for dementia staging.<sup>[4]</sup> The patients may range from perfectly normal to severe dementia.

Cataract and dementia are both age-related and may co-exist. At times, it is difficult to distinguish if visual complaints are due to cataract or dementia. Cataract surgery is known to improve cognitive performance.<sup>[5]</sup> Practice preferences for anesthesia in cataract surgery for patients with dementia remains controversial. Although general anesthesia (GA) is associated with known perioperative morbidities, ophthalmologists usually

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**Table 1: Global deterioration scale (modified after Reisberg et al.)<sup>[4]</sup>**

Stage	Signs and symptoms
Stage 1: No cognitive decline	In this stage the person functions normally, has no memory loss, and is mentally healthy.
Stage 2: Very mild cognitive decline	Normal forgetfulness associated with aging; for example, forgetfulness of names and where familiar objects were left. Symptoms are not evident to loved ones or the physician.
Stage 3: Mild cognitive decline	Increased forgetfulness, slight difficulty concentrating, and decreased work performance. People may get lost more often or have difficulty finding the right words. At this stage, a person's loved ones will begin to notice a cognitive decline. Average duration: 7 years before onset of dementia.
Stage 4: Moderate cognitive decline	Difficulty concentrating, decreased memory of recent events, and difficulty managing finances or traveling alone to new locations. People have trouble completing complex tasks efficiently or accurately and may be in denial about their symptoms. They may also start withdrawing from family or friends because socialization becomes difficult.
Stage 5: Moderately severe cognitive decline	Major memory deficiencies and the need for some assistance to complete their daily activities (dressing, bathing, preparing meals). Memory loss is more prominent and may include major relevant aspects of current lives; for example, people may not remember their address or phone number and may not know the time or day or where they are.
Stage 6: Severe cognitive decline (middle dementia)	Requires extensive assistance to carry out daily activities. They start to forget names of close family members and have little memory of recent events. Many people can remember only some details of earlier life. They also have difficulty counting down from 10 and finishing tasks. Incontinence (loss of bladder or bowel control) is a problem in this stage. Ability to speak declines. Personality changes, such as delusions (believing something to be true that is not), compulsions (repeating a simple behavior, such as cleaning), or anxiety and agitation may occur.
Stage 7: Very severe cognitive decline (late dementia)	Essentially no ability to speak or communicate. They require assistance with most activities (e.g., using the toilet, eating). They often lose psychomotor skills, for example, the ability to walk.

prefer GA in the majority of vulnerable elderly patients. The increasing number of patients with dementia is expected to have an impact on future provision of anesthesia, heralding a need to explore alternative options to GA.<sup>[6]</sup>

American Board of Internal Medicine (ABIM) Foundation launched the “Choosing Wisely” campaign in 2012, which is now accepted by more than 70 specialty society partners with a goal of advancing a dialogue about avoiding wasteful or unnecessary medical tests, treatments, and procedures; facilitating wise decisions about the most appropriate care based on a patient's individual situation.<sup>[7]</sup> Choosing wisely initiative was implemented in 2012 by the Anaesthesia Department for choosing anesthesia option based on GDS in patients with dementia undergoing cataract surgery.

## Material and Methods

Once a patient was diagnosed with dementia and the decision was made to operate, the attending ophthalmologist would indicate his/her preference for anesthesia and the patient would attend the preoperative anesthesia clinic. Previous baseline data collected by chart abstraction in January 2012 showed that >70% of patients received GA. After the introduction of the “Choosing Wisely,” the attending anesthetist and ophthalmologist would reassess the stage of dementia using GDS on the day of the surgery and anesthesia options would be reconsidered irrespective of the original preferred listing. Other factors such as patient's beliefs when corpus mentis, current wishes, general well-being, previous reports regarding behavior in the outpatient clinic, tolerance of pre-assessment procedures, ability to allow biometry tests, comprehension about the planned procedure, and response to venepuncture on the day of the surgery would be taken into consideration. A full discussion involving the operating ophthalmologist, anesthetist, nurses, and accompanying relative or caretaker would occur. Regional anesthesia (RA) would be offered if the above considerations were in its favor and if the stage of dementia was 5 or less using GDS. A proviso would be that, if adequate operating conditions were not achieved and surgery was difficult under RA due to excessive movement or lack of lasting patient cooperation, GA would be administered. All cases with GDS 6 or 7 would undergo GA. Our institution does not practice sedation during cataract surgery (unless patients are very anxious or intraoperative blood pressure is unduly high), in accordance with the guidelines issued from the Royal College of Anaesthetists and The Royal College of Ophthalmologists (UK) published in 2012.<sup>[8]</sup>

The Domain Specific Review Board exemption was obtained for retrospective analysis of anesthetic charts and interrogation of the operating theatre databases for all patients with a specific diagnosis of dementia who had undergone cataract surgery between September 2012 and August 2016. This represented the 4-year period after the introduction of the preoperative GDS assessment. Patient demographic data and ophthalmologists' preferred choice of anesthesia at the time of listing were noted. The ophthalmologist's original preferred choice of anesthesia was either GA, RA, undetermined (i.e., surgeons were unsure or undecided about anesthesia modality, indicating that GA would possibly be required), or topical anesthesia. Changes in the choice of anesthesia made on the day of the surgery (based on GDS staging), actual anesthesia administered, and occurrence of any intraoperative events were noted. A proviso would be that, if adequate operating conditions were not achieved and surgery was difficult under RA due to excessive movement or lack of lasting cooperation,

GA would be administered. All cases with GDS 6 or 7 would undergo GA. The data were analyzed using the statistical software package SPSS (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp).

## Results

Complete data of 136 patients was available for analysis. The mean age of the patients was 78 years, with 73.5% of the cohort being females. Majority of the patients belonged to the American Society of Anesthesiologists (ASA) physical status class 3 [Table 2].

Fifty-five percent (75 out of 136) of the patients were listed by the ophthalmologists for GA or undetermined (i.e., surgeons unsure or undecided about the anesthesia modality), and 44% (60 out of 136) for RA. One patient was wrongly listed under topical anesthesia by the ophthalmologist in the clinic. Eventually, 36% (49 out of 136) were administered GA and 64% (87 out of 136) of the cohort received RA. Thirty percent (26 out of 87) of the RA were sub-Tenon's block and 70% (61 out of 87) were needle blocks. Eight out of the 10 patients listed as undetermined by the ophthalmologists received GA. One patient listed under topical anesthesia was found to be unsuitable and finally RA was administered. Three patients (2%) originally deemed suitable for RA were administered GA.

For the purpose of analysis, the undetermined category was included as GA. The Kendall rank correlation coefficient between the technique listed by ophthalmologist and type of anesthesia performed was 0.6, which signifies moderate degree of correlation. There were no adverse outcomes reported arising from the choice of anesthesia.

## Discussion

GDS aided in guiding the choice of anesthesia and reduced the need for GA in patients with dementia undergoing cataract

surgery. We are not aware of any previously published study which has used GDS for this purpose. Sixty-four percent of the patients with dementia with GDS 5 or less were amenable to RA.

Some ophthalmologists opine that cataract has to be severe to justify putting them through surgery because it will cause some disruption to the patient's life. There are no universally accepted practice guidelines on the selection of anesthesia for cataract surgery in patients with dementia, both GA and RA have been used, but many ophthalmologists prefer GA.<sup>[9]</sup>

Postoperative delirium (POD) and postoperative cognitive dysfunction (POCD) occur increasingly in elderly patients after GA.<sup>[10,11]</sup> Whether or not anesthesia can lead to dementia remains controversial despite case-control, cohort, and prospective studies, including a meta-analysis of 15 case-control studies that failed to find any association between GA and subsequent Alzheimer's Disease (AD).<sup>[12]</sup> Quantification of postoperative cognitive decline such as emergence delirium, POD, and POCD is difficult in elderly patients who may have age-related cognitive decline. This quantification is much more difficult or impossible in patients with dementia.<sup>[13]</sup> The exact cause of POD and POCD and the mechanism how these affect cognitive decline are unknown but several studies have found perioperative factors such as preoperative memory decline, deep anesthesia, deep sedation, longer duration of surgery, major surgery, and use of anticholinergic drugs can increase the incidence.<sup>[10,11]</sup> Undertaking mitigation measure to reduce modifiable perioperative risk factors, such as avoiding general anesthesia, deep anesthesia, deep sedation (especially with benzodiazepines), hypotension, and minimizing the use of anticholinergic drugs in patients with dementia may be beneficial.<sup>[11]</sup> It has been suggested that surgeons and anesthesiologists should help patients and their relatives in making informed decisions, both for people already diagnosed with cognitive impairment or dementia, or those who are concerned about the impact surgery may have.<sup>[14]</sup> Until the association between POCD and development of dementia becomes clearer from good quality cataract-specific prospective studies, caution is required.

There has been a practice shift in the anesthesia technique from GA to RA in most countries (including the UK) for routine cataract surgeries; and there is a further trend towards topical anesthesia techniques.<sup>[15]</sup> Some authors<sup>[9]</sup> highlighted the challenges for ophthalmologists during cataract surgery in patients with dementia and the choice of anesthesia practices were found to be differing among cataract surgeons – the majority prefer GA but some are prepared to offer RA. Notably, it may be difficult to secure lasting cooperation

**Table 2: Demographic and descriptive data for the 4-year retrospective cohort**

Age in years ( $\pm$ SD)		78.0 ( $\pm$ 7.4)
ASA physical status (I, II, III, IV)		1/60/75/0 (1%, 44%, 55%, 0%)
Gender		36/100 (26%/74%)
Male/Female		
Anesthesia technique patient listed for by Ophthalmologist	General Anesthesia	65 (48%)
	Regional Anesthesia	60 (44%)
	Undetermined	10 (7%)
	Topical Anesthesia	1 (1%)
Type of Anesthesia performed	General Anesthesia	49 (36%)
	Regional Anesthesia	87 (64%)
	Topical Anesthesia	0 (0%)

from patients who have significant cognitive impairment. All local anesthetic techniques such as topical, needle-based, or cannula-based blocks have been used with varying success for cataract surgery. There will be rare situations where a wrong clinical judgment is made in staging dementia, cataract surgery is performed under RA and the surgery cannot be completed without conversion to GA. Although sedation can help calm the patient, it may not be desired by some surgeon as there is the risk of sudden waking up and patient's head movement interfering with surgery. ASA closed claim report<sup>[16]</sup> confirms this assertion and sedation should be avoided whenever possible.

The retrospective nature of this study would portend minor limitations. The GDS staging of all patients was not recorded and we only determined GDS stages >5. In hindsight, this set of data would have been helpful. We were unable to find exact details regarding other intraoperative difficulties, other than those patients who required conversion to GA, or if a significant adverse event occurred. Furthermore, our electronic perioperative records do not have mandatory fields to record surgeon's satisfaction.

## Conclusion

The GDS is a well-established and simple clinical tool which helped in choosing anesthesia option wisely for cataract surgery in patients with dementia. There is a global movement of "Choosing Wisely" initiative which encourages needful conversations on what constitutes appropriate and necessary treatment. Our experience indicates that RA is feasible in the majority of patients with dementia but GA should be considered whenever there is a doubt. A decision may be based on GDS, a well-established clinical criteria, and not arbitrarily. A collaborative approach between the anesthetist and ophthalmologist in selecting an appropriate choice of anesthesia for the particular patient with dementia would surely go a long way in improving overall care.

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## Conflicts of interest

There are no conflicts of interest.

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