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Case Report**A Case of Dementia and Cataract in the UK**Clare M Wilson^{1*} and Penny J D'Ath²¹ Chelsea and Westminster Hospital NHS Foundation Trust, 369 Fulham Road, London, SW10 9NH, United Kingdom² Division of Optometry & Visual Sciences, City, University of London, Northampton Square, London, EC1V 0HB, United Kingdom**Abstract**

An elderly patient with Alzheimer's disease had deteriorated with increasing confusion and clumsiness being attributed in part to visual deterioration. A right cataract extraction operation was performed and was successful despite the patient moving considerably during phacoemulsification due to lack of understanding. On examination, the operation appeared to be a success. However, unfortunately the patient's symptoms were not improved.

In the UK, decisions regarding eligibility of patients for surgery are judged on a case by case basis. This case has been fully anonymised in accordance with the BMJ guidelines which are considered to be the gold standard in the UK as it was impossible for capacity reasons to gain any meaningful informed consent from the patient. In addition, approval was sought and granted from City, University of London Research and Ethics Committee to publish this report.

Introduction

Approximately 5% of patients visiting an ophthalmology clinic above 60 years of age have dementia [1]. There is overwhelming evidence that cataract surgery unequivocally improves vision-specific functioning and vision-specific quality of life [2]. However, the benefit achieved by removing cataracts in demented patients is controversial. In patients with dementia, visual function and mood as well as emotional and general wellbeing improve after cataract surgery [3]. Conflicting studies attempt to discern the effect of cataract extraction on cognitive function. It could be surmised that as visual and cognitive decline are linked, the reverse would be applicable - as vision improves so would cognition. On balance, it appears that studies tending to show a link between visual improvement and increased cognition have design faults, or result from learning effect. However, there seem to be more conclusive studies showing lack of benefit. Visual hallucinations appear to improve in Alzheimer's disease after refractive correction. Visual impairment by cataract may stress impaired attentional mechanisms. Thus in patients with early cognitive impairment, cataract extraction may improve cognitive performance. However, the benefits of cataract extraction in established dementia are less clear. Mild cognitive impairment implies decline in cognitive ability such as memory, language, visual perception, without impairment in occupational or social functioning [1]. We present a case of an elderly patient with dementia undergoing cataract surgery and the issues of consent surrounding this.

Case Report

An elderly patient with Alzheimer's disease presented with suspected bilateral visual loss. A deterioration had been noticed in their general condition, including increasing confusion, and considerable clumsiness. Although the referring GP was aware that these could be symptoms of progressing dementia, she was eager to rule out any treatable cause, such as visual disturbance secondary to cataracts. No previous ocular history was reported and their only regular medications were antihypertensives.

On examination, visual acuity testing was challenging and inconclusive. Anterior chambers were deep and quiet. The anterior lens capsule appeared clear, and nuclear sclerosis clouded the lens. Intraocular pressure was 15mmHg bilaterally. The vitreous was quiet and the retina flat with a few pigmentary changes at the macula, but no drusen or oedema.

The patient was listed for surgery. The patient underwent pre-assessment, their dementia was noted, but there was no discussion as to whether a general anaesthetic would be the most appropriate anaesthesia.

Consent was signed by two ophthalmologists, maintaining that surgery was in the patient's best interests. The anaesthetist was anxious about subtenons, but the consultant ophthalmologist decided to perform the block, which went uneventfully. Vision blue was used. The surgery progressed well until phacoemulsification when the patient became disturbed and could not understand the importance of remaining still and made several sudden head movements. Thankfully, on each occasion, the probe was removed without causing damage to the eye. The cataract was removed

***Corresponding author:** Clare M Wilson, Chelsea and Westminster Hospital NHS Foundation Trust, 369 Fulham Road, London, SW10 9NH, United Kingdom, E-mail: clarewil25@yahoo.com

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swiftly, an intraocular lens was injected into the bag. A 10'0 vicryl stitch was placed.

Post-operatively, the vision was again challenging to assess. Autorefractometry revealed near emmetropia (+0.25 / -0.75 x 170) negating spectacle correction for distance. Unfortunately, no noticeable improvement in their behaviour was noted.

Discussion

Globally, cataracts are the single most important cause of blindness accounting for 17.7 million bilaterally blind people, representing almost half of all causes of blindness due to eye diseases worldwide [4]. They contribute to more than 90% of the total disability adjusted life years [5]. The distribution of blindness from cataract closely relates to the economic prosperity of the geographical area, with only 5% of blindness secondary to cataracts in the USA and UK, but 58.5% of blindness in Peru, and in Africa, 55% of blindness [4].

In 2005, a general consensus estimate of age-specific dementia prevalence suggested that 24 million people had dementia, and that the number would double every 20 years [6]. The International Classification of Diseases-10 (ICD-10) states that dementia is an age-related clinical syndrome involving progressive cognitive decline for at least six months, sufficient to interfere with social or occupational functioning. It must involve memory impairment and at least one other impaired cognitive domain such as language, judgment or visual perception [7]. However, as many dementias do not have memory loss as a fundamental part, this definition may soon change. For example, dementia with Lewy bodies, Parkinson's disease and posterior cortical atrophy (also known as visual variant Alzheimers) show more pronounced visual perception impairment and milder memory impairment.

Approximately 5% of patients visiting an ophthalmology clinic above 60 years of age have dementia [1]. There is a strong association between decreasing cognitive test scores and decreasing visual acuity [8]. The Common Factor Theory demonstrates that a common factor underlies both cognitive and visual decline. It states that cognitive tests are low in patients with low vision as they also have cognitive impairment. It has also been shown that if you reduce vision in middle aged people, the cognitive function results do not go down. So "old age vision", does not give you "old age cognition" [1].

The risk factors for cataract and dementia overlap: age, female gender, smoking, diabetes, obesity, lower socioeconomic class. It may be suspected that dementia patients would have a higher incidence of cataract, but this was not found in the Nurses Health Study of 16,000 women [9].

Consent for surgery in patients with dementia is covered by the Mental Capacity Act 2005. Deontology, the action to do good, or to "do the right thing" should underlie all medical practice. Paternalism must be carefully justified, and depends on three conditions – (1) the patient's autonomy must be impaired by mental incompetence, (2) there is a risk of harm and (3) the patient would be later grateful for the intervention once they recovered

the capacity for rational reflection [10]. In this patient, it was felt advantageous to the patient to perform the surgery and the consent form was signed by two doctors. In 2006, a benchmark study in the UK set a standard for accuracy of refractive outcomes in normal eyes after cataract surgery to target within +/- 0.50 diopter for 55% of cases and +/- 1.00 diopter for 85% of cases [11]. This was adhered to in this operation, although the final visual perception from the patient may have been less beneficial than hoped for.

There are no official guidelines on the suitability of dementia patients for local anaesthesia, or how to pre-assess these patients, however a low threshold for general anaesthesia, particularly in operations requiring such stillness as small incision cataract surgery, seems sensible. It was previously thought that the general anaesthesia itself may cause deterioration of memory function, but this has been disproved, although not in patients with dementia [12]. A dilemma is reached when a patient is discovered on the day of surgery to have dementia without a general anaesthetic work-up, as in the reported case. In the UK, it is then to the discretion of the surgeon whether or not to proceed with the operation. Various measures can be taken to decrease the likelihood of patient movements during surgery. Topical anaesthesia is inadvisable, sub tenons or peribulbar at least offering ocular akinesia, vision blue should be used for enhanced visualisation in case of difficulties. Moral and ethical dilemmas such as these have been discussed in the literature with respect to cancer patients in other countries who have been found to be treated less aggressively if they have a diagnosis of dementia. Gregory (2016) raises the interesting question of whether these patients should even undergo screening for cancer if treatment differs to patients without dementia [13].

King George III is well known for his psychiatric medical history, popularised in part by a main stream 1994 film "The Madness of King George" adapted from the acclaimed play by Alan Bennett. In the final decade of his life, King George III was blind from bilateral cataracts. It is now questioned whether he suffered from variegated porphyria. The possibility of bipolar disorder seemingly more likely; in his final years, he had chronic mania with dementia [14]. His condition prompted what was probably the first clinical study into the relationship between blindness and mental illness. A survey was conducted of eight blind lunatics in St Luke's, Guy's and Bethnal Green hospitals; apparently there was no deterioration when they became blind. The House of Lords Select Committee asked "will the king's blindness retard or promote his majesty's recovery?" and the response was "Upon the whole I don't think it rather unfavourable; It has not been found by experience that deranged persons who are blind are more apt to become imbecile from seclusion (than those who see)..." [14].

In summary, thorough and thoughtful pre-operative assessment of the demented patient listed for cataract surgery can improve patient and surgeon experience. Not all successful cataract surgery will lead to an increased quality of life, and not all cataract surgery is successful, therefore the judgement by the ophthalmologist of the patient with reduced mental capacity must be well educated.

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