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STROKE AND CATARACT SURGERY: AN INCIDENTAL ASSOCIATION OR A CAUSAL RELATIONSHIP?

Neurology

Nishtha Jain Senior Resident, Department of Neurology, Government Medical college, kota

Rajshree Bhati Associate Professor, Department of Pathology, Government Medical college, kota

Vijay Sardana Senior Professor, Department of Neurology, Government Medical college, kota

ABSTRACT

Stroke and cataract are related in the manner that they share many common risk factors. We have observed an unusual occurrence of stroke in the immediate post operative period after cataract surgery. There has not been any study or case series showing association between the cataract surgery and occurrence of stroke. Here we present a case series of three patients who presented with definite stroke in the post operative period after cataract surgery. Whether they have an incidental association or a causal relationship needs further evidence.

KEYWORDS

Stroke, Cataract, Cataract surgery.

Introduction

Worldwide, stroke is a leading cause of death, with stroke mortality being particularly high in Eastern Europe and Asia (World Health Organization, 2004). By 2020, 19 out of 25 million annual stroke deaths will be in developing countries (Lemogoum et al., 2005). Stroke is also the leading cause of disability in adults. Of the hundreds of thousands of stroke survivors each year, approximately 30% require assistance with activities of daily living, 20% require assistance with ambulation, and 16% require institutional care. Some 88% of these events are ischemic strokes; 8% to 12% of ischemic strokes result in death within 30 days. Large number of factors that may be classified as modifiable and non modifiable increase the risk for ischemic stroke. Non modifiable risk factors for stroke include older age, male gender, ethnicity, family history, and prior history of stroke. Modifiable risk factors may be subdivided into lifestyle and behavioural risk factors and non-lifestyle factors, although these two subgroups are interrelated. Presumed modifiable lifestyle risk factors include cigarette consumption and illicit drug use. Non-lifestyle risk factors include low socioeconomic status, arterial hypertension, dyslipidemia, heart disease, and asymptomatic carotid artery disease.

Similarly cataract is a major cause of blindness worldwide, particularly so in India[1]. Cataract constitutes 55% of total blindness in this country[2] and it shares many common risk factors with stroke and hence can exist in same population. Now a days increasing number of patients with cataract are going for the surgery. Though the guideline for Surgical & Non-Surgical Management of Cataract in the Otherwise Healthy Adult Eye (Summary of the Alberta Clinical Practice Guideline, August 1996 which was updated in 2007) mention cerebrovascular episode as a medical complication of the procedure but there has not been enough case reports or case series in literature showing causal relationship between the cataract surgery and increase in incidence of stroke. We here report three cases who presented with stroke in the postoperative period after uneventful cataract surgery.

Cases

1. A 65 years old female known case of Hypertension, Diabetes Mellitus type II and Coronary artery disease on regular medications presented with complaints of sudden onset weakness of right half of the body alongwith decreased vision on right side. Patient has undergone cataract surgery 7 days prior to the onset of complaints and the procedure was uneventful. Her medications including antiplatelets which she was taking for coronary artery disease were stopped prior to the procedure and those were not restarted by the patient after the procedure. On examination patient was having right sided hemiparesis alongwith right homonymous hemianopia with planter extensor response on the right side. Possibility of stroke was kept and MRI brain was done which was suggestive of subacute infarcts involving left posterior cerebral artery(PCA) territory(figure1). Her haematological and biochemical parameters alongwith carotid Doppler were normal and echocardiography was showing diastolic dysfunction with ejection fraction of 68%.
2. A 65 years old male known case of hypertension and old right Middle cerebral artery(MCA) infarct(2 years back) on regular medications presented with complaints of sudden onset weakness of the left side alongwith slurring of speech. Patient has undergone cataract surgery 10 days back prior to the onset of the complaints. His medications including antiplatelets were also stopped prior to the procedure which he was taking as he already had a right MCA infarct two years back and these were not restarted after the procedure. On examination patient was having left hemiparesis alongwith left sided upper motor neuron type seventh nerve paresis. Keeping the possibility of acute stroke CT head was done which showed acute infarct in right MCA territory(Figure2).
3. A 61 years old male presented with complaints of sudden onset weakness of left half of the body alongwith slurring of speech. Patient has undergone cataract surgery one day prior to the onset of the complaints. On examination patient was having left hemiparesis alongwith left sided upper motor neuron type seventh nerve paresis and extensor planter response on the left side. CT head was showing hypodensity in the Right MCA territory suggestive of acute infarct. Echocardiography was showing hypokinetic anterior septum with diastolic dysfunction. Carotid Doppler was showing atheromatous calcified plaque in the left carotid bulb with 22% stenosis.

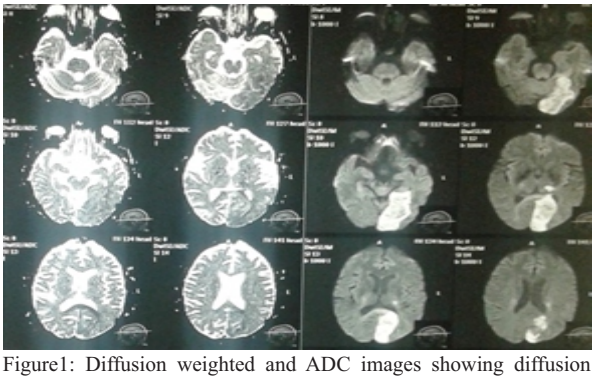


Figure1: Diffusion weighted and ADC images showing diffusion restriction(hyperintensity in DWI and hypointensity in ADC) in the left PCA territory

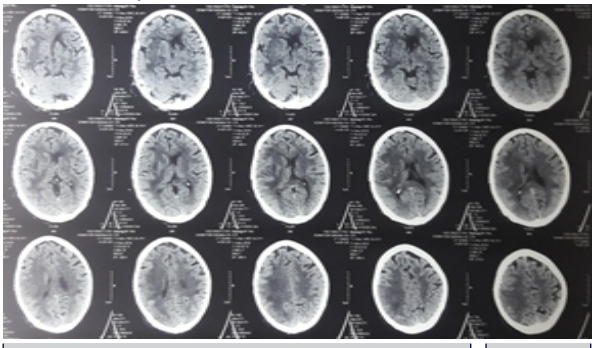


Figure2: CT head (Axial section) showing hypodensity in the right MCA territory

Discussion

Stroke and cataract share many common risk factors for their occurrence like Increasing age, Diabetes, Smoking, Obesity, High blood pressure, Drinking excessive amounts of alcohol. So they can occur in many elderly persons together but there has not been any major case series about increase in incidence of stroke in the postoperative period following cataract surgery. There can be many possible factors contributing to it.

The retrobulbar anesthesia, used with or without regional anesthesia of cranial nerve VII (facial nerve) which provides excellent ocular akinesia and anesthesia has been mentioned to have complications like retrobulbar hemorrhage; globe penetration; optic nerve trauma; and inadvertent intravenous injection is associated with cardiac arrhythmias. The induction of arrhythmias in these patients can lead to stroke. These occurs secondary to the oculocardiac reflex due to stretching of ocular structures. This can occur during the procedure due to manipulation of the globe or can occur later also if it occurs secondary to the pressure of the expanding retrobulbar haemorrhage which can occur due to retrobulbar injection. This theory can be hypothesized for the third patient who was having hypokinesia on echocardiography which can lead to clot formation due to stasis and on induction of arrhythmias could have led to stroke. The incidence of the oculocardiac reflex can be decreased by injection atropine and proper cardiac monitoring for 24 hours after the procedure.

There has been many studies who have showed increased risk of vertebrobasilar stroke secondary to the neck manipulation and hyperextension of the neck. During cataract surgery also such a position of the neck is maintained for the duration of the procedure. Dittrich et al.[3], conducted a prospective case– control study, and identified exposure to cervical spinal manipulation therapy(cSMT) and other activities involving various forms of neck movement increased the incidence of stroke.

In 1992, Weintraub et al[4] described the "beauty parlour stroke syndrome" in elderly women, with subsequent demonstration of vertebral artery flow reduction at the atlanto-occipital junction by hyperextension and rotational movements[5] leading to stroke which can typically be delayed over several hours after the procedure. The vertebral artery is especially vulnerable to mechanical compression and intimal injury. Magnetic resonance angiography and two-dimensional phase-contrast techniques, to depict in-vivo blood flow, yielded volume flow rates reflecting end-organ perfusion and flow velocity changes in both carotid and vertebral arteries in neutral, sustained hyperextension, and rotational positions. Distinct haemodynamic changes were identified only in the vertebral arteries with selective vulnerability in individuals harbouring a hypoplastic vertebral artery[6]. There was also a higher incidence of stroke on magnetic resonance imaging, indicating that neck hyperextension may be a neglected haemodynamic factor with a pivotal role in the pathogenesis of stroke[7]. As in cataract surgery also the neck is placed in hyperextension position so this can be a cause for increasing the perioperative risk of stroke in such patients. So a more compatible positioning should be done in patients with multiple risk factors for stroke or previous history of stroke.

There is no recommendation regarding stopping the antiplatelets in patients already on these drugs for various reasons as it will increase the risk for thrombotic events in persons predisposed if the coagulation profile is normal. Cataract is common in the age group in which cardiovascular problems are common, so many patients are likely to be on antiplatelet medications. It has been seen that the platelet function generally recovers if the aspirin cessation period exceeds 96 hours[8].There is lot of debate regarding this issue and many authorities favour the stopping of drugs prior to the procedure. In a study by katz et al[9], it was postulated that there were no significant differences in incidence of stroke and myocardial infarction in patients who discontinued aspirin and warfarin from patients who continued the use of these medications. The Royal College of Ophthalmologists, Cataract Surgery Guidelines, 2010 recommends that as long as antiplatelets do not threaten the success of cataract surgery, it is desirable to continue them before surgery. Stopping these medications increases the risk of stroke and death. In the first two cases there was history of stoppage of antiplatelets so it can be hypothesized as a possible cause.

Conclusion

There is no current evidence and studies to show relationship between cataract surgery and stroke. They may be associated due to common risk factors described or there may be a causal relationship as various causes hypothesized above but more evidence is required for the same. As seen in the cases discussed above whether the stoppage of antiplatelets is justified in cases already having cardiovascular/ cerebrovascular disease is still debatable and further studies are required to clarify the issue.

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