Intracerebral Hematoma after Surgical Correction of Strabismus

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Most patients with strabismus are in good health. However, the incidence of strabismus is high in patients with central nervous system dysfunction and musculoskeletal abnormalities. Authors report one case of intracerebral hematoma due to bleeding from an intracranial arteriovenous malformation after a surgical correction of strabismus under general endotracheal anesthesia. The initial operation and postoperative course of this case were uneventful except for several episodes of nausea and vomiting, continuing hours after the operation. Twenty-four hours after the operation, the patient showed a stuporous mental state and right-sided hemiplegia. A brain C-T scan and carotid angiography revealed an intracerebral hematoma with small-sized vascular abnormalities in the frontoparietal region on the left side. Following an emergency evacuation of the hematoma and removal of the malformed vessels, the patient showed progressive improvement.

Key Words: Strabismus, intracerebral hematoma, arteriovenous malformation

One of the most frequent ophthalmologic operations performed in children is the surgical correction of strabismus. In recent years, there has been an increasing tendency for the operation to be done on an outpatient basis.

Although the patient may appear to have an isolated problem of strabismus, it may be a part of a syndrome. Though the patient seems to be normal, the physician needs to be aware of a syndrome with strabismus as a component (Abramowitz, 1982).

This is a case of intracerebral hematoma with serious neurological defects resulting from a rupture of an intracranial arteriovenous malformation, following the surgical correction of strabismus.

A CASE REPORT

A 9-year-old girl with a left-sided eyeball deviation was scheduled for surgical correction of strabismus. Her history included eyeball deviation since birth with a surgical correction of the right side strabismus performed three years earlier. There was no known history of congenital disease or anomaly in her family.

Upon physical examination she was found to be otherwise healthy; neurologic examination showed no remarkable defect. Chest X-ray and routine hematologic test results were all within normal limits.

Premedication consisted of the injection of atropine sulfate, 0.2mg., and hydroxyzine, 25mg., given intramuscularly one hour before going to the operating room. Anesthesia was induced with thiopental, 150mg, intravenously and the tracheal was intubated. Blood pressure was 100/60 torr and heart rate was 105 beats/minute on arrival at the operating theater. Within four minutes after the endotracheal tube intubation, the blood pressure had increased to 120/90 and the heart rate had increased to 120. Anesthesia was maintained with halothane, N2O, and O2, and a long-acting muscle relaxant was not used. Five minutes after starting anesthesia there seemed to be some endotracheal secretion making it necessary to suction the bronchus twice. An endotracheal suction catheter was used. Shortly afterward, blood pressure and pulse rate increased slightly, then again stabilized. There were no significant changes in vital signs during the operation and the electrocardiogram revealed no abnormal changes. At the end of a fifty-minute procedure, anesthesia was routinely discontinued. The patient slowly regained consciousness in the recovery room. During the next hour, the patient was extremely restless and vomited several times. After that, the endotracheal tube was
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Fig. 1. Brain computerized tomography scan showing intracerebral hematoma.

removed and the patient was discharged from the recovery room. Back in her room, she went one hour without any significant change in her vital signs. She was comfortable with a blood pressure of 110/70 torr and a heart rate of 88 beats/minute. Approximately 5 hours postoperatively, she vomited twice and her blood pressure and pulse rate increased to 130/90 torr and 120 beats/minute, respectively. During the ensuing postoperative night she vomited once more; her vital signs were stable. In the morning, she became drowsy and showed right-sided hemiplegia with an aphasic state.

Investigation. Brain C-T scan and carotid angiography were performed revealing an intracerebral hematoma in the frontoparietal region on the left side and suspicious configuration of arteriovenous malformation (Fig. 1 and 2).

Operation. An emergency operation for the removal of the hematoma was performed. On opening the dura, the cortex at the site of the hematoma was found to be bulging and appeared blushed in color. Abnormally enlarged feeding vessels and reddish veins draining to the superior sagittal sinus were noted. After removal of the intracerebral hematoma, the abnormally tangled vessels were also removed.

Postoperative course. The patient was in a stuporous mental state for two days postoperatively. She then began regain her consciousness and showed slight improvement in motor power over her right extremities. On the eighth postoperative day, she could walk by herself and also showed a marked amount of recovery from the aphasia. On the 27th day, the patient was discharged with mild motor weakness and slightly disturbed speech.

Pathologic findings: The specimen consisted of numerous abnormal veins, arteries, and blood clots (Fig. 3). The abnormal arteries and veins were moderate in size. The arteries had thick, smooth muscle fibers in media and elastic lamellae were revealed by staining with van Gieson's solution (Fig. 5). The veins, the walls of which were thin and lacking in elastic lamellae (Fig. 4), had relatively large lumens.
DISCUSSION

This case suggests that the anesthetic management of pediatric patients for strabismus surgery may involve a subtly challenging danger (Romano and Robinson, 1971).

The majority of patients with strabismus, however, are healthy normal children amenable to outpatient surgery or discharge the morning after surgery (Stelling, 1974; Steward, 1980).

Although there is no evidence that congenital anomaly is associated with strabismus, the incidence of strabismus is high in patients with central nervous system dysfunction such as cerebral palsy, meningocele with hydrocephalus, various stages of retinopathy of prematurity, and traumatic cranial nervous palsy (France, 1984; Vaughan, 1975; Abramowitz, 1982). Further, a number of observers have reported that in malignant hyperthermia an individual often demonstrates a localized area of muscle weakness or musculoskeletal abnormalities (Britt, 1974; Dodd et al., 1981; Donlon et al., 1978; Beasley, 1974).

Strabismus, or malalignment of the visual axes, occurs in 5% of the population and infantile strabismus occurs within the first 6 months of life and is often noted soon after birth as in this case (France, 1984; Reinecke, 1979).

We cannot find in the literature that strabismus is related to arteriovenous malformation. However, it is suggestive that the patient with strabismus may have nervous system dysfunction, musculoskeletal abnormalities or some other anomaly. The etiology of infantile extraocular muscle imbalance is suspected to be an innervational abnormality of the central nervous system, but this is yet to be confirmed.

Clinically, it is essential that a full and meticulous history of the patient should be taken from the parents. A full anesthetic history is also especially important because of reports concerning the association of strabismus and malignant hyperthermia (Morgan, 1965; Smith, 1975).

Postoperative nausea and vomiting of the short-stay strabismus patient is a major indication that discharge should be delayed. Although these side effects occur after other types of surgery, their incidence is particularly high following strabismus surgery. The vomiting is probably centrally mediated. Droperidol (75μg/kg) is said to be an effective antiemetic agent. The incidence of vomiting in the placebo group was 85%, compared to 43% in the droperidol group by Abramowitz's study (Abramowitz, 1981). Without any
specific indications in the history or any recognizable changes in the vital signs or other abnormal physical findings, it is difficult for us, in the early stage of the problem, to determine whether or not the postoperative vomiting of strabismus surgery is being caused by a rupture of an arteriovenous malformation. (Arancibia and Shapiro, 1984). Endotracheal intubation and suction during anesthesia and in the recovery room may be thought to trigger the rupture of malformed vessels.

In conclusion, there are several aspects of strabismus that are of special interest to the anesthesiologist and surgeon. These include:
1. the incidence of strabismus is high in patients with central nervous system dysfunction, and musculoskeletal abnormalities. Arteriovenous malformation could coexist with strabismus as in this case.
2. the incidence of nausea and vomiting in the postoperative period is particularly high following strabismus surgery.

If delayed emergence and recurrent vomiting is noticed, the cause should be investigated as soon as possible and prompt treatment administered to prevent a disastrous outcome.

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