CASE REPORT

INTRACEREBRAL HEMORRHAGE DUE TO NOSOCOMIAL ASPERGILLOSIS FOLLOWING NEUROSURGERY

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Abstract. A unique case of nosocomial aspergillosis following neurosurgery in a 10 year old girl was documented. She presented with intracerebral hemorrhage after three weeks of operation for evacuation of craniopharyngioma. To our knowledge, this is the first reported case of intracerebral hemorrhage due to nosocomial aspergillosis following neurosurgery.

Nosocomial infection of the central nervous system, regardless of the causative agent, is difficult to treat and often resistant to conventional medications. Infection is usually indolent until heralded by serious complication. Aspergillosis of the central nervous system has a mortality rate close to 100 % (Darras *et al,* 1996). Although it most commonly occurs in the immunocompromised hosts (Minamoto *et al,* 1992; Polo *et al,* 1992; Epstein *et al,* 1991; Boon *et al,* 1990; Morioka *et al,* 1990), aspergillosis has been reported following neurosurgery (Darras *et al,* 1996; Casey *et al,* 1994; Kim *et al,* 1993; Takeshita *et al,* 1992; Piotrowski *et al,* 1990; Galassi *et al,* 1978; Feely *et al,* 1977; Shapiro and Tabaddor, 1975; Visudhiphan *et al,* 1973). This paper is the first to document cerebral aspergillosis presenting with intracerebral hemorrhage following neurosurgery.

A 10-year old girl was admitted with the chief complaint of headache and vomiting for one month. There was no weakness nor convulsion. Pertinent physical examination revealed a drowsy child with bilateral papilledema. There was left facial nerve palsy of the lower motor neuron type. The motor tone was increased. The motor power for the upper and lower extremities were IV/V and III/V respectively. A bilateral Babinski sign was present. Deep tendon reflex was 4+ with positive clonus in both feet. The examination of heart, lung and abdomen were not remarkable. Computer tomographic scan of the brain disclosed a large cystic mass at the frontal and supresellar area. The mass measured 3.5 x 2.5 x 3 cm^3. Blood tests showed leukocytosis with 79% neutrophils. Blood chemistry revealed hyponatremia (127mmol/l) and hypercholesterolemia (340 mg/dl). Biopsy of the mass found it to be craniopharyngioma, hence evacuation of the suprasellar mass was performed. After the operation, the patient appeared to have recovered well. Respiratory support was not needed after three days. She gradually gained consciousness. But three weeks later, she became comatose again. A repeat computer tomographic scan showed intracerebral hemorrhage at the left temporal area, intraventricular hemorrhage and subdural effusion. Craniotomy was again performed and a hematoma was identified at the base of skull. Massive active bleeding was seen, but arterial ligation was not successful. Six units of packed red blood cells, two units of fresh frozen plasma and fluid replacement of 3,000 ml were given but failed to maintain the blood pressure. The patient died two days after the operation.

Autopsy was limited to the brain and thoracic organs only. The brain weighed 850 g and showed both uncal and tonsillar herniation. Blood clot was seen at the basal part of the brain. Upon tracing for the site of rupture, a small tear at the left middle cerebral artery was noted. Hematoma was seen around the ruptured site. Serial coronal sections revealed a small cystic residual tumor measuring 2 x 1.5 x

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1 x cm^3 located below the right basal ganglia. Just adjacent to the third ventricle, an area of blood clot measuring 5 x 4 x 5 cm^3 was seen which was also present within the third ventricle.

Histologically, the residual tumor demonstrated epithelial lining and squamous pearl consistent with craniopharyngioma. The middle cerebral artery at the ruptured site showed fungal colonies invading the artery. The septated fungus displayed typical acute angle dichotomous branching and stained slightly basophilic with hematoxylin and eosin. The morphology of the organism was highly suggestive of *Aspergillus* spp. Surrounding tissue showed severe acute inflammation. Special stain for fungus (Grocott's-Methenamine Silver stain) helped with the identification of the organism. The diagnosis was strictly made on morphologic criteria; culture was not performed. The histologic findings of heart and lungs were not remarkable.

Aspergillosis, together with mucormycosis, a disease caused by fungal organisms has the tendency to invade vessels (Moris, 1989). Usually cerebral aspergillosis follows a disseminated course. The portal of entry may be from hematogenous spread (Torre-Cisnero *et al,* 1993), direct extension from adjacent organs (Mohandas *et al,* 1978), or following neurosurgery, as in this case. With the deterioration of the patient's condition two weeks after the operation and aspergillus hyphae identified at the ruptured site of left middle cerebral artery, a nosocomial infection following neurosurgery was the most probable cause. Darras-Joly *et al* (1996) reported three nosocomial cerebral aspergillosis in three patients, one of which survived. The survivor had an aspergillus abscess and was treated with a cummulative dose of 9.5 g amphotericin B over a 45-day period plus 5 flucytosine for 7 weeks, itraconazole (800 mg/day) for 6 months and 10 intraventricular injection of amphotericin B (0.5 mg each) (Darras-Joly *et al,* 1996).

The presentations of cerebral aspergillosis following neurosurgery include abscess formation (Darras-Joly *et al,* 1996; Kim *et al,* 1993; Galassi *et al,* 1978), subarachnoid hemorrhage (Piotrowski *et al,* 1990), aneurysm formation (Takeshita *et al,* 1992), meningitis and arterial occlusion (Feely *et al,* 1997), hydrocephalus (Casey *et al,* 1994) and ruptured fungal aneurysm (Visudhiphan *et al,* 1993). However a massive intracerebral hemorrhage as the presenting symptom of aspergillosis after neurosurgery has not been previously reported. This case is presented to call for an awareness of the possible aspergillus infection of the central nervous system following neurosurgery. It is most important to establish the diagnosis as early as possible and institute prompt medical treatment with an antifungal agent.

ACKNOWLEDGEMENTS

The authors would like to thank Miss Wimon Yomana and Mrs Patcharee Boonachot for secretarial assistance. The help of Mr Daniel P Mason in reviewing the manuscript is gratefully acknowledged. Printing of this manuscript is supported by Faculty of Tropical Medicine, Mahidol University, Thailand.

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