

Brainstem Cavernoma: Wath Management?

Diallo Moussa^{1*}, Faye Mohameth², Kissao Nissao² and Decq Philippe³

¹Neurosurgery department of Gabriel Touré teaching hospital, Bamako

²Neurosurgery department of Fann teaching hospital, Dakar, Senegal

³Neurosurgery department of Beaujon Hospital, France.

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ABSTRACT

Management of brain stem cavernoma is not common in neurosurgery. Controversial opinions are reported in literature. The authors report the case of a 34 years old patient treated for a brain stem cavernoma. Therapeutic issues relative to this entity are reviewed and discussed through this paper.

Material and methods: A 34 years old male patient with no medical background who was complaining about limbs paresthesia followed by left leg weakness leading to gait disturbance had been hospitalized.

Outcomes: Imaging studies showed a right-sided pontine cavernous malformation with hemorrhage. A stereotactic biopsy and a surgical excision were performed with good result.

Conclusion: Surgical excision of symptomatic brain stem cavernoma is a challenging surgery and represent the most advantageous alternative. An experienced team may achieve this without worsening the patient.

Keywords: Brain stem cavernoma, Hemorrhage, Stereotactic biopsy, Robot

INTRODUCTION

Brain stem cavernoma is a special entity most often revealed by hemorrhage. Its management is subject to controversies. Surgical excision of brain stem cavernoma is one of the most challenging surgery. The authors report a pontine cavernoma in a 34 years old patient without medical background. Therapeutic issues relative to this entity are reviewed and discussed through this paper.

CASE REPORT

A 34 years old male patient with no medical background was complaining about limbs paresthesia followed in a week by left leg hypoesthesia and weakness leading to gait disturbance. The cerebral CT scan shows an acute pontine bleeding on the right side. The patient had been hospitalized for betamethasone corticosteroid therapy that decreased motors issues. After that he was released for a home follow up. Two months later he came for moderate headaches, swallowing issues, dizziness, diplopia and left sided weakness. The cerebral MRI demonstrated a pontine well definite lesion of about 29 x 26 mm (**Figure 1**), hyper intense on T1 weighted, hypo signal surrounding rim on T2 weighted and a blooming pattern on SW1. It also showed on diffusion sequences some surrounding artifact of blood

degradation products. There was a slight mass effect on the fourth ventricle without any upstream hydrocephalus. These imaging characteristics strongly suggested a pontine cavernous malformation.

A robot assisted stereotactic biopsy was performed (**Figure 2**) and brought back 5 ml of blackish blood. Post-operative period was uneventful and the patient showed slight improvement of dizziness, motor and swallowing issues. Postoperative CT scan showed an important hemorrhage residue.

Three weeks later the patient came with worsening of left-sided motor weakness, swallowing issues, nausea and

Corresponding author: Diallo Moussa, Neurosurgery department, Gabriel Touré de Bamako, BP 267, Bamako, Mail, Tel: +223 99 87 87 03/99878703; E-mail: mdiallo5@gmail.com

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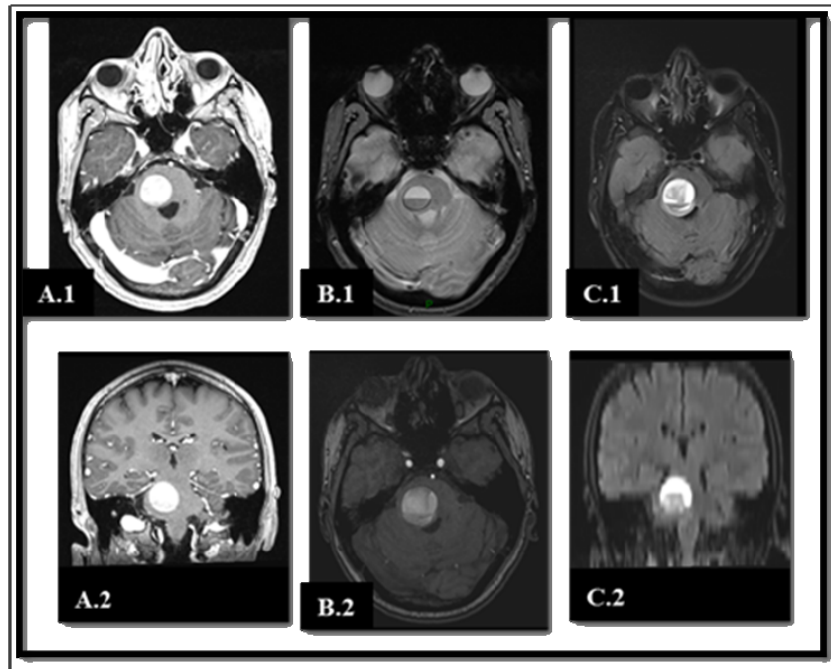


Figure 1. MRI showing brain stem cavernoma.

A.1: Axial T1 with Gadolinium; A.2: Coronal T1 with Gadolinium; B.1: Axial T2 (gradientecho); B.2: Axial TOF (Time of flat) sequence; C.1: Axial flair; C.2: Coronal flair

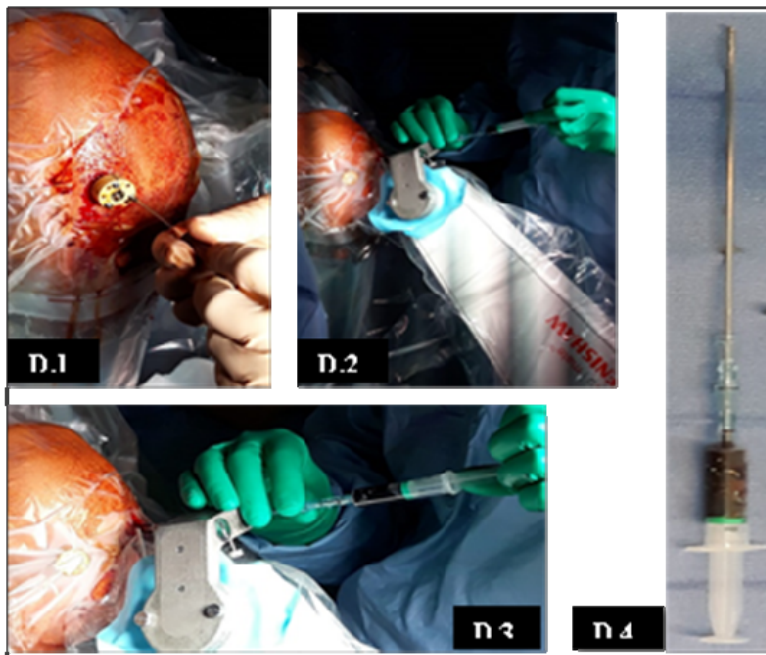


Figure 2. Robot assisted stereotactic biopsy of brain stem cavernoma.

D.1: Posing the Insert under local anesthesia; D.2: Spotting the hemorrhage with robot assistance; D.3: Puncture and aspiration of hemorrhage; D.4: Aspiration of 5 ml blackish blood

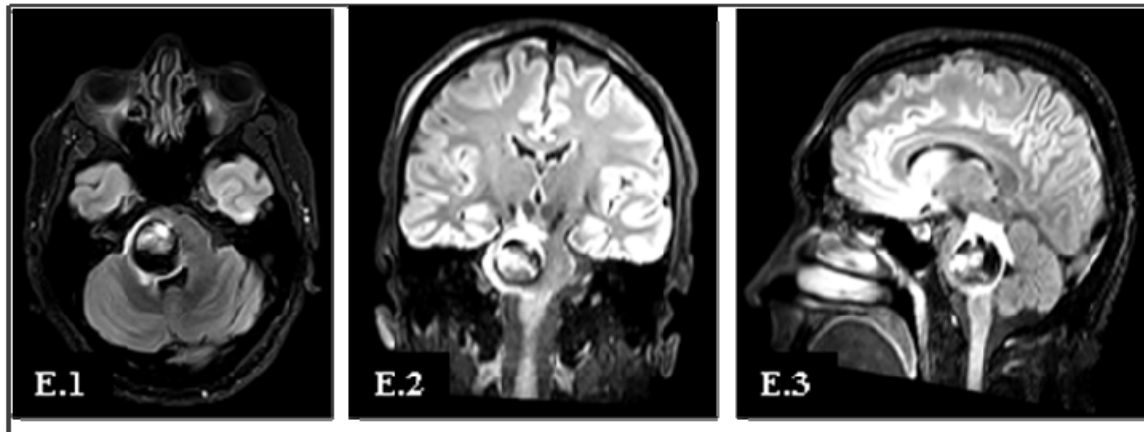


Figure 3. Post-operative MRI 3 weeks later, rebleeding.

E.1: Axial flair; E.2: Coronal flair; E.3: Sagittal flair

persistence of diplopia. A new cerebral MRI showed rebleeding (**Figure 3**). A suboccipital cerebellar interhemispheric approach in semi-sitting position was performed (**Figure 4**). Anatomic pathology exam revealed a cavernoma. In post-operative patient received steroids for a

week and physiotherapy leading to improvement of motor and swallowing issues and regression of nausea. At six months follow-up, slight swallowing issues and left sided weakness was noticed. At one-year follow-up the patient keeps slight gait disturbance.

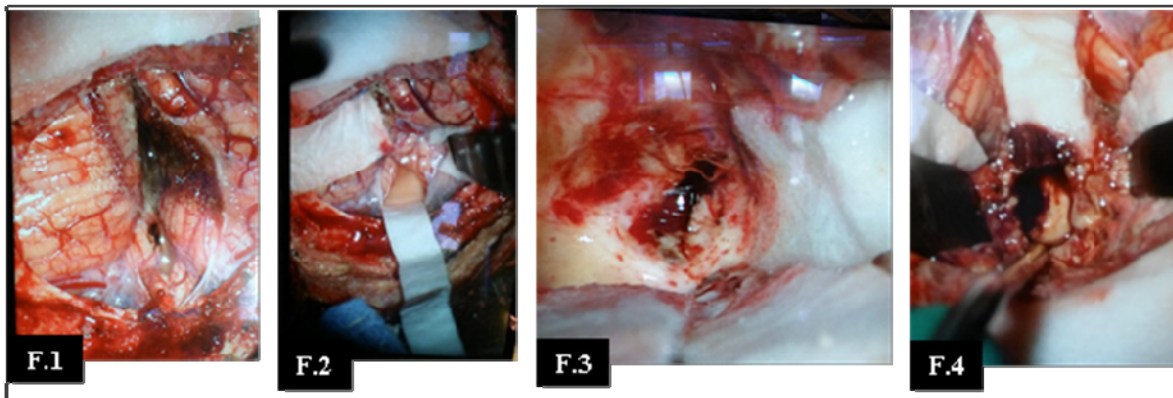


Figure 4. Intraoperative pictures.

F.1: Cerebellar interhemispheric view after cerebellomedullary cistern opening; F.2: Fourth ventricle opening; F.3: Posterior aspect of the brainstem (pons); F.4: Cavernoma excision

DISCUSSION

Cerebral cavernous malformations developing 0, 4 -0, 9% of population and comprise 8-15% of central nervous system vascular malformations [1]. Brain stem cavernoma occurs in about 9-35% [2,3] Pontine location is most frequently found [2,3]. Brain stem cavernoma constitute a special entity [4] due to high rate of hemorrhage. This rate is 30 times higher than in any other locations [4]. So that sudden or progressive onset hemorrhage is the main event of diagnosis as found in our case. Dexamethasone was help full to reduce the brain stem malignant swelling. Several authors recommend administration of steroids 1-2 weeks before surgery [5]. Robot assisted stereotactic biopsy was performed because of

recurrence of neurological symptoms. It was helpful to have a transitory improvement of symptoms and relieve the patient before surgery. According to Nataf [6], biopsy of cavernous malformations suggested on MRI must be avoid. Eloquent locations of brain stem cavernous malformation makes its removal one of the most difficult surgery [4]. It is a challenge to achieve a complete surgical resection keeping other neurological structures safe. Surgical excision is indicated for accessible cavernoma with prior hemorrhage [6]. However, there is no codified surgical procedure for brain stem cavernoma. There are several opinions about indications and timing of surgery [7]. Some authors recommend micro surgical removal for cavernoma with

prior bleeding and worsening of neurological impairment [8]. Others are for surgery in every patient even asymptomatic one [9]. In our opinion, surgical treatment for asymptomatic patients is excessive. Niranjana et al. recommend surgery in acute period or 4-6 weeks later [10]. According to them, in early phase of bleeding a cleavage plane between hemorrhage and surrounding healthy tissue exists. Several approaches are proposed (5; 7). The appropriate one depends on the relationship between cavernoma and brain stem's pial and ependymal surface [7]. Infratentorial supracerebellar approach is one of the most privileged surgical procedure [7]. We choose an infratentorial cerebellar interhemispheric approach in semi-sitting position in our case. It was helpful for a good excision with no worsening of patient symptoms. Mortality rate correlates to neurosurgeon's experience (1; 11). The rebleeding occurs in 43 - 44% and can be prevented by a complete surgical resection (7; 12). This rate is higher a month after surgery [2]. Incomplete resection may occur with a non-experienced surgeon. The higher the series the lower is the rate of incomplete resection [2,5].

CONCLUSION

Surgical excision is the best treatment of brain stem cavernoma. It is a challenge addressed by experienced neurosurgeons. Good surgery with a few sequelae is possible. Management of this affection needs to be codified.

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