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Colloid Cysts of the Third Ventricle: 24 Cases Review

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Abstract

Introduction: Colloid cysts are very rare in all brain tumors and almost always located in the anterio-superior of the third ventricle, between fornix, surround of foramen monro. The aim of this study is to evaluate the efficacy of surgery, address controversial issues in the treatment of symptomatic colloid cysts and review of the literature.

Methods: A retrospective chart review was performed on all patients with colloid cyst who underwent surgery in our department between 2000-2017. They were evaluated based on clinical features, imaging features, surgical approaches and outcomes.

Results: Twenty four cases of colloid cyst of the third ventricle were operated upon between 2000-2017. Fourteen cases were male and 10 cases were female. Their ages were between 24 and 60 years old. 16 patients were operated on by using anterior transcallosal approach and 8 patients by using transcortical transventricular approach. In all patients total excision of the lesions achieved and there was no mortality.

Conclusion: Surgery is a safe and effective treatment for colloid cyst of the third ventricle. We reviewed the surgical approach for colloid cyst of the third ventricle and discussed with the literature.

Keywords: Colloid cyst; Third ventricle; Surgical approach

Introduction

Colloid cysts are rare congenital and benign intracranial tumors, constitute 2% of all intracranial neoplasm's [1,2-21]. They usually occur in the anterior and antero superior part of the third ventricle [3,4]. The cysts may cause obstruction of the foramen monro and as a result of impeded Cerebrospinal Fluid (CSF) flow; hydrocephalus with lateral ventricle dilatation may form. Clinical presentation is heterogeneous. The symptoms may be non-specific or related to the rate of hydrocephalus development [3,5]. The frequently symptoms were headaches and findings of intracranial hypertension. Sudden deaths associated with acute hydrocephalus or cardiovascular failure due to abrupt disturbance in hypothalamic function have also been described [3,6,7,22]. It has been very easily diagnosed without using invasive diagnostic techniques. Colloid cyst may be a completely accidental finding as well, when the patient performs imaging of the head due to the complaints that are unrelated to the cyst. The incidence of colloid cysts is increasing owing to extensive use of modern diagnostic methods such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) of the head [3,8].

Transcallosal/transventricular, transcallosal/interfornical, transventricular/subarachoroidal and stereotactic approaches have been successfully used to remove these lesions. The operative mortality rate has been reduced to almost zero by the use of new microsurgical techniques. This report which summarizes our treatment of colloid cysts in 24 cases during the past 17 years.

Materials and Methods

We performed a retrospective review of data from all patients undergoing surgery for colloid cyst of the third ventricle between 2000 and 2017 in the department of neurosurgery at Health Sciences University, Izmir Bozyaka Training and Research Hospital, Izmir, Turkey. We reviewed the medical records, radiological findings and surgical reports of all patients. We also collected the data of the demographic information, preoperative signs and symptoms, surgical approach and postoperative complications. All patients underwent radiological workup by using brain CT and MRI.

Results

In this study we were operated on 24 patient's diagnosed colloid cyst of the third ventricle

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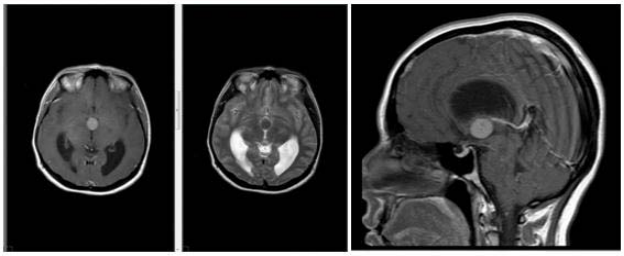

Figure 1: T1W_TSE+C Axial, T2W Axial, T1W_TSE+C Sagittal section (Age: 27).

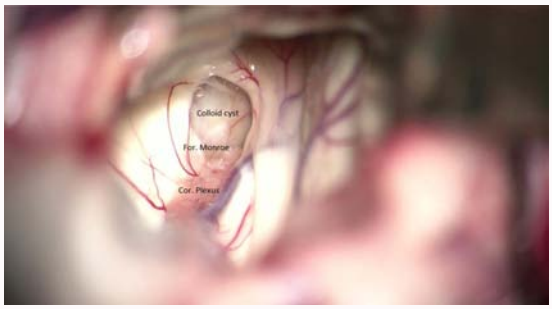

Figure 2: Transcortical approach (intra-operative view of a patient, Age: 27).

between 2000 and 2017 (14 males, 10 females). The youngest patient was 24 years old, the oldest 60 years old (average age: 41). The most common symptom was headache. Neurologic investigation revealed papilledema in 21 (87.5 %), mental disorder in 8 (33.3%), ataxin 10 (41,6 %), tremor in 2 (8.33 %) of the cases. One patient was asymptomatic. We had performed CT and MRI in 24 cases. Sixteen patients were operated on by using anterior transcallosal approach (Figure 1). In 8 patients the transcortical transventricular approach was used (Figure 2). In all patients' total excision of the lesions achieved. All patients underwent radiological workup by using brain CT and MR on the first day after operation.

There was no mortality. One of the patients developed intracerebral haematoma on the first postoperative day. The haematoma was evacuated immediately and the patient improved. One of the patients developed subdural haematoma postoperative in the first day and the haematoma regressed spontaneously. In our series, none of the cases had postoperative epilepsy. There was no recurrence and their active lives were normal during 2 years to 9 years follow up.

Discussion

Colloid cysts of the third ventricle, also known as paraphyseal or neuro-epithellial cysts are rare lesions. They are rare congenital and benign intracranial tumors, representing up to 2% of all intracranial neoplasms [1,2,3,7,9,17-21]. Although they are solitary and sporadic, rare examples of cysts on other locations and familial forms are known [9-11]. In all cases of described patients, a solitary colloid cyst of the third ventricle was the common pathology. However, they differed in their clinical presentation. Various symptoms are characteristic of colloid cysts. It may be detected incidentally for unrelated symptoms or because of specific problems caused by the cyst itself. These are often the result of different forms of hydrocephalus as well as irritation of major important centers around the third ventricle [3,5,12,22]. In addition to headache, nausea and vomiting, the symptoms may also present as disorders of consciousness, psychiatric symptoms and even sudden death [7,12-16].

Acute hydrocephalus forms lead to a rapid deterioration of consciousness. This raises the question of whether the colloid cyst abruptly increased in volume or there was a rapid displacement of the cyst towards foramina monro, resulting in their blockage. An increase in the cyst volume may be possible due to accumulation of its content and as a result of bleeding into the cyst. Both conditions increase the cyst volume, which may result in sudden death [4,7,17]. Headache and worsening of consciousness in the setting of cyst enlargement may arise from blockage of foramina monro, ventricles [7]. In this study, the most common symptom was headache. In one patient, the patient was asymptomatic and the cyst was discovered accidentally.

With the use of Computed Tomography (CT) and Magnetic Resonance Imaging (MRI), more cases are being recognized, and these lesions are probably more frequent than was commonly thought. Colloid cysts of the third ventricle have been very easily diagnosed with CT and MRI without using invasive diagnostic techniques. Kelly [9] described three types of presentation: a) headache and papilloedema without neurological signs, b) fluctuating or progressive dementia, c) classical features such as episodic headaches and drop attacks. These symptoms are caused by increase intracranial pressure due to intermittent or permanent occlusion of the foramina of monro by the cysts. Local masses near the fornices or the floor of the third ventricle may produce such neurological deficits very rarely. In this study, CT and MRI demonstrate the exact locations, size, and extend of the lesions (especially, we used MRI for preoperative approach).

The operation was recommended due to the possibility of the cyst growth during the coming years, which could cause unexpected deterioration of consciousness. Over the years the cyst was expanding slowly and causing the symptoms [1,8]. Due to different composition and density of the contents, which depends on the quantity of cholesterol and protein, cysts may have a diverse appearance on imaging [8,18]. Cysts with a high content of cholesterol and protein are hyper dense on plain CT, hyper intense on T1 and hypo intense on T2 weighted MR sequences [1,8,18].

Microsurgical removal of colloid cysts of the third ventricle by transcallosal and transcortical approaches are the most effective procedures. We used both procedures. 16 patients were operated on by anterior transcallosal approach. In 8 patients the transcortical transventricular approach was used. The symptoms, neurological examination findings and surgical outcomes in our series are generally in agreement with literature knowledge [2,5]. We believe that, both procedures have advantages and disadvantages and the best surgical approach to achieve the most satisfactory results is still a matter of debate. All in all, the transcortical-transventricular and transcallosal are predominantly used, with the former bearing higher morbidity. According to the literature, no significant difference in mortality was found between the two operational techniques [1-22]. Rarely, sub frontal lamina terminals approach may be used [21]. The potential complications are transient or permanent memory lose, motor deficits, seizures, hemorrhage, hydrocephalus and infection [1,2,5,20,21]. We prefer the transcallosal approach as the cortex may be spared and due to direct surgical access to the cyst area. The likelihood of complications is higher in those cysts, which are large cysts or rapidly increasing (bleeding into cyst) [21].

Surgical treatment of colloid cysts encompasses three techniques: stereotactic aspiration, endoscopic fenestration and microsurgical

approach [5,7,15,19-21]. Mainly, the latter two are being used. Not only the size and location of cysts, also their contents affect the success of treatment. Some cysts may be drained with stereotactic aspiration completely or their volume may be reduced, but only if the content is not too dense [7,17]. Usually, the treatment is surgical, either through craniotomy or endoscopic, since only the removal of the cyst or at least its fenestration may improve the CSF flow that prevents the risk of sudden neurological deterioration [15,22]. In case of deep midline location and the proximity of vital structures and the neuroendoscopy may be used as an alternative [21]. It is described as a less invasive technique with qualities such as reduced operative time, lower morbidity and quicker recovery after the procedure.

Both techniques, microsurgery and neuroendoscopy are equal in mortality and shunt dependency [20,21]. However, all colloid cysts may not be removed completely during neuroendoscopy. It is known that incomplete resection carries a higher risk of recurrence and also in time, the cyst may recur. On the other hand, microsurgery is associated with a higher rate of total resection [20]. Total resection of colloid cyst carries an excellent prognosis and in the endoscopic group, the reduced number of total resections may lead to a higher recurrence rate in long-term follow up, which might be a serious disadvantage of endoscopy [5,15,21]. According to Sheikh *et al.*, the microsurgical technique leads to complete resection of the cysts in 98% in comparison to neuroendoscopy, where the success is 58% [5]. Despite the possibility of cyst recurrence and higher reoperation rate, some reports state the risk of recurrence and reoperation is minimal with meticulous coagulation of the cyst wall and when complete resection is achieved with the endoscopic technique [5,21]. Our patients were treated micro surgically. And we managed to remove the cysts entirely. In all patients' total excision of the lesions achieved. There was no mortality. In our series, none of the cases had postoperative epilepsy. There was no recurrence and their active lives were normal during 2 to 9 years follow up.

Conclusion

The risk of sudden neurological deterioration cannot be predicted on the basis of the cyst size, the accompanying hydrocephalus and the duration of symptoms. Therefore, surgical treatment is recommended. Early detection and prompt treatment with complete removal of the cyst improve the symptoms and the patient has an excellent prognosis. Microsurgical removal of colloid cysts of the third ventricle by transcortical approaches are the most effective procedures. Both procedures have advantages and disadvantages. In the presence of hydrocephalus, we prefer the transcortical approach, because, it is easier and operation time is shorter than the transcallosal approach. If the ventricles are normal or the patient had a previous shunting procedure, the transcallosal operation is preferred.

We have no experience with stereotactic operations. But it seems that this type of treatment may be used as an initial treatment with a rather high risk of recurrence. Complete excision of a cyst can safely achieved by open method.

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