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Surgical management of ventrally based lower cervical (subaxial) meningiomas through the lateral approach: Report on 16 cases

Hisham Adel Aboul-Enein[a,*], Wael Mahmoud Khidr[a], Khaled Mohamed Abdeen[a], Aly Abo Madawi[b]

[a] Department of Neurosurgery, Alexandria University, Egypt
[b] Department of Neurosurgery, Suez Canal University, Egypt

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ABSTRACT

Objectives: Spinal meningiomas are benign and relatively rare tumors. These tumors present about only 25% of primary spinal tumors. Although spinal meningiomas are considered as slowly growing benign tumors, yet they may cause devastating neurological deficits rendering patients crippled. This study describes performing a posterolateral approach to surgically treat anterior based cervical meningioma. We hereby report on 16 cases operated upon using this approach, and we present our results and display some of our cases with special emphasis on achieving total resection, rate of recurrence and the neurological outcome.

Patients and methods: The study reports on 16 patients who underwent surgery for anterior based cervical meningioma. Data regarding age, sex, duration and type of symptoms, levels, topographical locations, surgical results, and histological features are presented.

Results: The age ranged between 19 and 78 years old with a mean age of 48.3 years. The initial symptom among most patients (13 patients) was neck pain, numbness and radicular pain were found in 9, and clumsiness of the upper extremity in 7 patients. Total excision with dural coagulation was done in 11 cases, and spilt dura technique was feasible in 4 cases where the tumor together with the inner dura layer was resected. We encountered one case of atypical meningioma with Pia and arachnoid invasion which rendered total excision too risky and only subtotal resection was achieved. There were no major surgical or permanent neurological complications. Lateral mass fixation was used in 2 patients with a strictly midline anterior tumor in which a total facetectomy was done. All patients were followed up for an average of 3.6 years. Tumor recurrence was seen in 3 patients.

Conclusions: The lateral approach allows for safe and total removal of ventral cervical meningioma. This approach gives a direct avenue to the tumor without risk of destabilizing the vertebral column. The rate of recurrence is the same when using the anterior approach but is less invasive with less blood loss.

1. Introduction

Spinal meningiomas are benign and relatively rare tumors [1]. These tumors present about only 25% of primary spinal tumors. Although spinal meningiomas are considered as slowly growing benign tumors, yet they may cause devastating neurological deficits rendering patients crippled [2]. Spinal meningiomas have a female predominance commonly occurring in the older age group [2,3]. These tumors may occur as sporadic tumor or as a part of NF2 syndrome [1,4]. Microsurgery and neurophysiological monitoring offer a better prognosis and a decrease in the incidence of morbidity [5,6]. Anteriorly based spinal meningiomas are not common yet different approaches were described to resect these tumors. Each approach has its advantage and carries its risk [7,8].

Meningiomas are best treated surgically by a radical removal of the tumor together with its dural origin and drilling of bony reactions surrounding it (Simpson grade 1). A successful surgical treatment of spinal meningioma constitutes resecting the tumor without jeopardizing the preoperative neurological status while preserving spinal stability [9]. The achievement of these goals

* Corresponding author at: Department of Neurosurgery, Alexandria University, 15 Mahmoud Shoukry Street, Smouha, Aleandria, Egypt.
E-mail addresses: hishamaabdelaziz@yahoo.com (H.A. Aboul-Enein), waelkhedr2000@yahoo.com (W.M. Khidr), khaledabdeen@hotmail.com, khaledabdeen66@yahoo.com (K.M. Abdeen), ali.madawi@yahoo.com, aamadawi@yahoo.com (A.A. Madawi).

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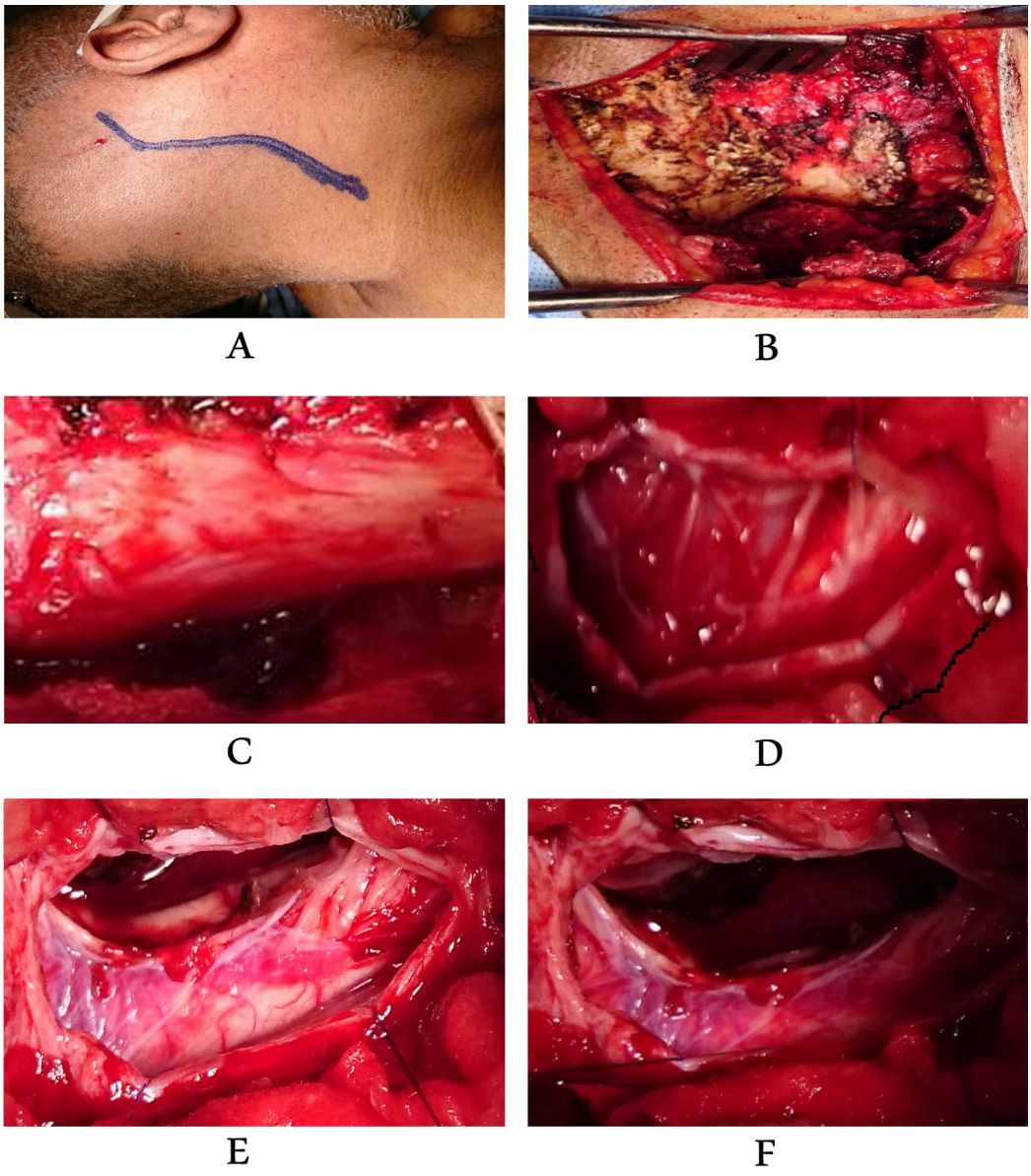

Fig. 1. The steps for using the lateral approach to ventral based cervical meningioma. The patients are put in lateral position with the head flexed and lateral rotated 30 degree to the contralateral side. The skin incision is a lazy S extending a level above and below the desire segment (A). Muscle stripping is then carried out to reach the facet joint and the ipsilateral hemi-lamina and spinous process. A unilateral hemi-laminectomy to expose the dura covering the desired segment, a partial facetectomy may be carried on in cases of strictly ventral meningioma without a lateral projection (B). The dura is then opened on the lateral wall of the thecal sac exposing the tumor and the cervical roots, yet the cord remains protected by the covering dura (C and D). The dentate ligament is cut above and below the tumor to allow a safe tumor manipulation away from the cord. Tumor resection is the carried on without any compromise to the cord and leaving the arachnoid covering (E). The cord remains untouched with its arachnoid covering and the ventral dura is coagulated ensuring a Simpson grade 2 tumor resection (F).

depends on several factors: the preoperative neurological condition, tumor size, extent of dural attachments, and invasion of the Pia or arachnoid membrane, and patients' co-morbid condition [9–11].

This study describes our surgical experience in dealing with 16 cases suffering from ventrally based cervical meningioma via the lateral approach. We hereby describe the approach used and the clinical outcome of these patients.

2. Objectives

In this study we report our experience in treating 16 cases of ventrally based lower (subaxial) cervical meningioma surgically through the lateral approach to decompress the cord and coagulate the dural origin. We report the rate of recurrence observed during the follow-up period.

3. Materials and methods

This study is a retrospective study reporting on 16 consecutive cases of ventrally based lower cervical meningioma treated surgically between 2003 and 2014 using the lateral approach. All cases signed an informed consent according to the local ethics committee at our University. All patients were clinically followed postoperatively for at least 14 months. Radiological follow-up MRI was performed annually to detect any recurrence.

3.1. Position and skin incision

The side of the approach was chosen according to the lateral projection of the meningioma. Patients were put either in a lateral position (bark bench) or in prone position with tilting of the