

Technical Note & Surgical Techniques

A new concept for making decisions regarding the surgical approach for spinal meningiomas: The T-line, a preliminary study



Toshiya Tachibana *, Keishi Maruo, Shinichi Inoue, Fumihiko Arizumi, Kazuki Kusuyama, Shinichi Yoshiya

Department of Orthopaedic Surgery, Hyogo College of Medicine, 1-1 Mukogawa-cho, Nishinomiya, Hyogo 663-8501, Japan

ARTICLE INFO

Article history:

Received 14 December 2015

Accepted 17 January 2016

Keywords:

Spinal meningioma

Surgical approach

Tumorectomy

Durotomy

ABSTRACT

Objective: The objectives of this study were to propose the T-line, new assistant lines for making decision of surgical approach for anterior spinal meningioma.

Background: There was a controversy over how spinal meningiomas should be approached when they were located especially anteriorly to the spinal cord because treatment of dura should be performed without spinal cord injury.

Methods: We introduce a new concept for making a decision for the surgical approach for spinal meningioma. If the point of intersection of the tangent of the tumor and spinal cord (T-line 1) and the bisected line of the facet (T-line 2) is located on the anterior side of the lamina (T-line [+]), tumors should be excised via the posterolateral approach. If the point of intersection is located on the posterior side of the lamina (T-line [-]), tumors can be excised via the posterior approach. Twelve patients with spinal meningioma who were diagnosed and surgical treated in our department constituted the study population.

Results: In the 8 cases with T-line (+), tumors were excised via the posterior approach. However, in the 2 cases with T-line (-), tumors were excised via posterolateral approach. The average of preoperative JOA score was 10.2 ± 2.7 . The Japanese Orthopedic Association Scoring System for cervical myelopathy (JOA score) significantly improved to 14.1 ± 1.5 at the final follow-up ($P < 0.05$). The recovery rate of the JOA score was 55.4%.

Conclusion: The T-lines may be useful when making decisions for the surgical approach for spinal meningioma.

© 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Spinal meningiomas make up approximately 25% of all spinal tumors, and they are the second most common tumors after the nerve sheath. They are predominantly found in females (82%), and 83% occur in the thoracic spine [1]. Spinal meningioma is usually located laterally to the spinal cord, whereas in 14% of cases, it is located anteriorly to the spinal cord [1].

Spinal meningiomas should be excised along with treatment of the dura mater (Simpson grades I and II) [2] because tumor cells invade into the inner layer and outer layer of the dura matter [3,4].

Especially in cases where they are located anteriorly to the spinal cord, the surgical approach for resection needs to be considered. However, an adequate approach for anterior meningioma is controversial. We introduce a new concept for making a decision for regarding the surgical approach for spinal meningiomas.

2. Materials and methods

2.1. The T-line

To draw the T-line, we mainly used principally the axial view of the MRI. We first decided the tangent of the tumor and the spinal cord (T-line 1) and the bisected line of the facet in the dominant side of the tumor (T-line 2) (Fig. 1). According to the T-line, spinal meningioma cases were divided into 2 groups: the T-line (+) group and the T-line (-) group. In the T-line (+) group, the point of intersection between T-line 1 and T-line 2 was located on the posterior side of the lamina. Because there will likely to be an enough space where tumors can be excised by the posterior approach with laminectomy and one-half facetectomy, we named this group “plus” (Fig. 2). In the T-line (-) group, the point of intersection was located in the anterior side of the lamina. Because there will likely not be enough space for the posterior approach, tumors can be excised by the posterolateral approach with total facetectomy and fusion (Fig. 3). When the tumors are located anteriorly to the spinal cord, the point of intersection of T-line 1 and T-line 2 was located on the anterior side of the lamina, and these cases were classified as T-line (-) (Fig. 4). However, when tumors are located from more laterally or posteriorly to the spinal cord, the point of

* Corresponding author at: Department of Orthopaedic Surgery, Hyogo College of Medicine, Nishinomiya, Hyogo 663-8501, Japan.

E-mail address: tachi@hyo-med.ac.jp (T. Tachibana).

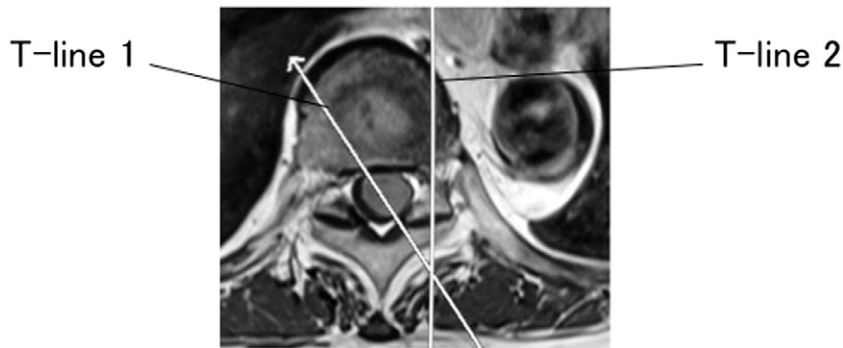


Fig. 1. We introduce a new concept for making decisions regarding the surgical approach for spinal meningiomas. We focus on the intersection of the tangent of the tumor and the spinal cord (T-line 1) and the bisected line of the facet on the tumor dominant side (T-line 2).

intersection of T-line 1 and T-line 2 may be the following: located posteriorly on the posterior side of lamina, disappeared, or located anteriorly from the tumors. All of these situations are considered T-line (+) (Fig. 4).

2.2. Patients, data collection and statistical analyses

The local ethics committee authorized this study. We collected from our departmental database all cases with spinal meningioma in the period from 1997 to 2012. Thirteen cases with spinal meningioma who received excision in our department except one case with a dumb-bell tumor were evaluated retrospectively. Evaluated factors were the following: T-line, surgical approach, tumor excision, and recurrence. Moreover, clinical scores were assessed using the Japanese Orthopedic Association Scoring System for cervical myelopathy (JOA score), both pre- and postoperatively as well as postoperative recovery rate which was calculated as follows: recovery rate (%) = (postoperative JOA score – preoperative JOA score) × 100/(17 – preoperative JOA score) [5].

In the statistical analysis, the Student *t*-test was performed using Excel (Microsoft Corporation Redmond, WA, USA). A *p*-value of <0.05 was considered to indicate significance.

3. Results

There were 1 male and 11 females. The average age of the patients was 64.7 years. There were 2 cases with cervical meningioma and 10 cases with thoracic meningioma. The average duration of follow-up was 8 years and 7 months (range: 2 years and 11 months–17 years and 5 months).

Tumors were totally excised in all 12 cases (Simpson grade I: 6 cases, grade II: 1 case, grade III: 5 cases). Eight cases were in the T-line (+)

group and two cases were in the T-line (–) group. There was no preoperative information in 2 cases. In all of the 8 cases in the T-line (+) group, tumors were excised via the posterior approach. However, in both cases in the T-line (–) group tumors were excised via the posterolateral approach with laminectomy and total facetectomy on the tumor-dominant side following posterior spinal fusion. In one of them, because tumorectomy was a partial resection in the first operation via the posterior approach, complete excision with durotomy and dural reconstruction were done via the posterolateral approach in the second operation (Figs. 3 and 5). Tumors recurred in 2 of 5 cases without preparation of the dura (Simpson grade III). Posterior approach was used in these cases. One of 2 cases was T-line (+). Another case had no preoperative information. The average of preoperative JOA score was 10.2 ± 2.7 . The JOA score significantly improved to 14.1 ± 1.5 at the final follow-up ($P < 0.05$). The recovery rate of the JOA score was 55.4%.

4. Discussion

An adequate approach for anterior meningioma has been a controversial topic. There are two approaches for anterior spinal tumors: the posterior approach [6,7] and the lateral approach [8,9]. Previous studies have only described their own approach for anterior tumors. There have been no reports that consider which tumors should be excised by the posterior approach or the posterolateral approach. The present study may be the first report, which focuses on this point. Voulgaris et al. [7] reported 10 cases whose anterior meningioma was excised via the posterior approach without motor deficit. There was no MRI image information for any of these cases except their typical case presented in the study's figure. Their typical case was T-line (+). Therefore, most cases in their report may be T-line (+), which can be excised via the posterior approach. Acosta et al. [8] reported 14 cases whose anterior meningioma or schwannoma was excised via the modified paramedian

T-line (+)

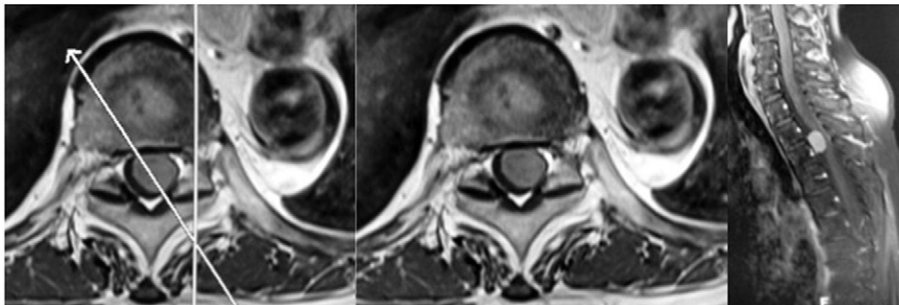


Fig. 2. If the point of the intersection is located on the posterior side of the lamina, tumors can be excised via the posterior approach; T-line (+).

Download English Version:

<https://daneshyari.com/en/article/3057765>

Download Persian Version:

<https://daneshyari.com/article/3057765>

[Daneshyari.com](https://daneshyari.com)