

## 研究方案

颈椎哑铃型肿瘤的新型术前评分和分类方法：提高手术规划的有效性

### 1. 研究背景与目的：

颈椎哑铃型肿瘤（DTCS）的手术治疗具有高度复杂性和风险。现有的分类系统缺乏对肿瘤与周围组织三维空间关系的全面评估。本研究旨在开发和验证一种新的 DTCS 术前评分和分类系统，以提高手术安全性，减少术后并发症，改善患者预后。

### 2. 研究设计：

回顾性队列研究

### 3. 研究对象：

2016 年 1 月至 2023 年 12 月期间，在我院接受 DTCS 手术治疗的 100-200 名患者。

### 4. 纳入标准：

- 经 CT 和 MRI 确诊为 DTCS 的患者
- 年龄范围：20-70 岁
- 同意参与研究并签署知情同意书

### 5. 排除标准：

- 既往接受过颈椎手术的患者
- 合并有其他严重疾病影响手术决策的患者

### 6. 研究方法：

#### a. 术前评估：

- 使用 MRI 和 MSCTA-VRT 进行影像学检查
- 根据新开发的评分系统对肿瘤进行评分和分类

#### b. 手术治疗：

- 所有患者采用后正中入路手术
- 根据评分和分类结果制定个体化手术方案

#### c. 术后随访：

- 术后 3 天、1 周、6 个月进行 MRI 和 MSCTA-VRT 复查

- 使用 McCormick 量表和颈部功能障碍指数（NDI）评估神经功能恢复情况
7. 主要结局指标：
- 肿瘤完全切除率
  - 术后神经功能改善程度
  - 术后并发症发生率
8. 次要结局指标：
- 手术时间
  - 术中出血量
  - NDI 评分变化
9. 统计分析：
- 使用 SPSS 26.0 软件进行数据分析
  - 采用单因素方差分析比较不同分类肿瘤的手术时间和出血量
  - 使用重复测量方差分析评估术前、术后 1 周和 6 个月的 NDI 评分变化
  - 多因素 logistic 回归分析评估评分因素与手术难度和并发症的关系
10. 伦理考虑：
- 本研究已获得吉林大学第二医院伦理委员会批准。所有患者均签署知情同意书。
11. 数据管理：
- 所有患者数据将被匿名化处理，并存储在加密的数据库中。只有主要研究人员可以访问完整数据集。
12. 预期结果：
- 我们预期新的评分和分类系统将显著提高 DTCS 手术的安全性和有效性，为临床决策提供更可靠的依据。

# Research Protocol: A Novel Preoperative Scoring and Classification System for Dumbbell-Type Cervical Spinal Tumors: Enhancing Surgical Planning Efficacy

## Background and Objectives:

Surgical treatment of dumbbell-type cervical spinal (DTCS) tumors is highly complex and risky. Existing classification systems lack comprehensive assessment of the three-dimensional spatial relationships between tumors and surrounding tissues. This study aims to develop and validate a new preoperative scoring and classification system for DTCS tumors to improve surgical safety, reduce postoperative complications, and enhance patient outcomes.

## Study Design:

Retrospective cohort study

## Study Population:

100-200 patients who underwent surgical treatment for DTCS tumors at our hospital between January 2016 and December 2023.

## Inclusion Criteria:

Patients diagnosed with DTCS tumors confirmed by CT and MRI

Age range: 20-70years

Consent to participate in the study and signed informed consent

## Exclusion Criteria:

Patients with previous cervical spine surgery

Patients with other severe diseases affecting surgical decision-making

## Methodology:

### a. Preoperative Assessment:

Imaging examinations using MRI and MSCTA-VRT

Tumor scoring and classification based on the newly developed scoring system

### b. Surgical Treatment:

All patients will undergo posterior midline approach surgery

Individualized surgical plans will be formulated based on scoring and classification results

### c. Postoperative Follow-up:

MRI and MSCTA-VRT re-examinations at 3 days, 1 week, and 6 months postoperatively

Neurological function recovery assessment using McCormick scale and Neck Disability Index (NDI)

## Primary Outcome Measures:

Complete tumor resection rate

Degree of postoperative neurological function improvement

Incidence of postoperative complications

## Secondary Outcome Measures:

Operation time

Intraoperative blood loss

Changes in NDI scores

Statistical Analysis:

Data analysis using SPSS 26.0 software

One-way ANOVA to compare operation time and blood loss among different tumor classifications

Repeated measures ANOVA to evaluate changes in NDI scores preoperatively, 1 week, and 6 months postoperatively

Multivariate logistic regression analysis to assess the relationship between scoring factors and surgical difficulty and complications

Ethical Considerations:

This study has been approved by the Ethics Committee of the Second Hospital of Jilin University. All patients will sign informed consent forms.

Data Management:

All patient data will be anonymized and stored in an encrypted database. Only principal investigators will have access to the complete dataset.

Expected Results:

We anticipate that the new scoring and classification system will significantly improve the safety and efficacy of DTCS tumor surgeries, providing more reliable guidance for clinical decision-making.