

## **ABSTRACT**

**Background:** Spinal arachnoid cysts (SACs) are rare lesions that often present with back pain and myelopathy. There is a paucity of literature evaluating the impact of surgical timing on neurological outcomes for primary SAC management.

**Objective:** To compare long-term neurological outcomes in patients with SAC who were managed conservatively, surgically, or conservatively followed by surgery and to understand natural progression of SAC.

**Methods:** We conducted a retrospective analysis of adult patients treated for SAC at our institution from 2010 to 2021, stratified into three groups (conservative management only, surgical management, or conservative followed by surgical management). Study outcome measures were neurological outcomes as measured by modified McCormick Neurologic Scale, cyst recurrence, and postoperative complications. Nonparametric analysis was performed to evaluate differences between groups for selected endpoints.

**Results:** In total, 36 patients with SAC were identified. Eighteen patients were managed surgically. The remaining 18 patients were managed conservatively with outpatient serial imaging, 7 of whom (38.9%) ultimately underwent surgical treatment due to neurological decline. Most common presenting symptoms included back pain (50.0%), extremity weakness (36.1%), and numbness/paresthesia (36.1%). Initial/preoperative ( $p=0.017$ ) and one-year post-operative ( $p=0.006$ ) McCormick scores were significantly different between the three groups, but not at 6 weeks or 6 months postoperatively ( $p>0.05$ ). Additionally, at one year, there was no difference in McCormick scores between patients who were managed surgically and those who were managed conservatively but ultimately underwent surgery ( $p>0.99$ ). Postoperative cyst recurrence rates were similar in patients who underwent preoperative MRI alone vs MRI+CT myelogram ( $p>0.99$ ).

Furthermore, the use of intraoperative ultrasound did not significantly decrease postoperative cyst recurrence rates ( $p=0.73$ ).

**Conclusions:** A significant proportion of patients who were initially managed conservatively underwent surgery secondary to neurological decline. Delayed surgical intervention in minimally symptomatic patients does not seem to result in worse long-term neurofunctional outcomes. At 1-year, postoperative MNS were noted to be significantly higher in both surgical groups, when compared to the conservative group highlighting the potential long-term worsening neurological symptoms of patients regardless of pre-operative observational status.