

Introduction

The insertion of available cervical retractor systems is relatively complex for a limited exposure required for single level anterior cervical discectomy. A novel cervical retractor system is introduced and the initial experience of its application is reported.

Methods

A simple retractor system is designed which is fixed to the vertebral body through the Caspar pins. The design allows the retractor to move with vertebrae, during distraction through traditional Caspar distractor system. The advantages and limitations of the device based on the initial experience are discussed.

Results

The author has utilized current version of the retractor on 32 cases of single level anterior cervical discectomies. The insertion of the retractor is easy and its application provides safe and satisfactory anterior cervical exposure. There have not been related complications, although transient dysphagia has not been prevented.

Conclusions

The designed retractor system is simple and efficient for single level anterior cervical discectomy and its insertion is relatively easier

Device Description

The retractor system consists of medial and lateral retractors (figure 1). For each medial or lateral retractor there are two options of rostral or caudal hook-like extension. Each retractor includes a retractor body having first and second ends, the first

Figure 1



Figure 1 – Medial retractor (lower) and lateral retractor (upper). For each medial or lateral retractor there are 2 options of rostral or caudal hook-like extension.

blade body to a support manual gripping, the second end sits over the longus coli and through a hook-like extension, engages with a vertebral bone anchor pin. The height of the retractor allows comfortable application of distractor systems. The design allows the retractor to move with vertebrae, during distraction through traditional Caspar distractor system. The hook-like extension design allows limited range of mediolateral movement before fixation to extend or reduce anterior exposure of the disc. The retractor is designed so that it minimizes rotation around the pin while providing maximal exposure. The medial retractor has an acute angle between body of the retractor and the hook-like extension and the lateral retractor has an open angle. They are designed so that when fixed on the bone do not let the soft tissue herniation from medial and lateral aspect into the operative field.

Figure 2

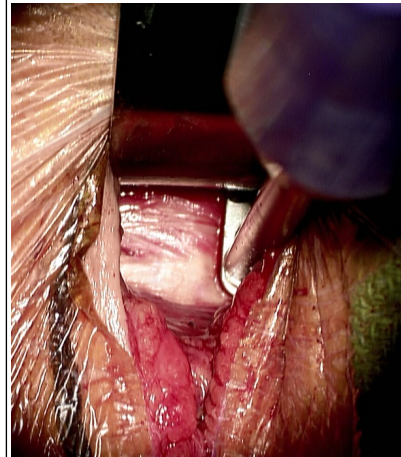


Figure 2 – Medial retractor inserted

The angles are optimized for angled view of the surgeon to decompress the contralateral foramen.

Insertion Technique

The author chooses the operative side contralateral to the radicular compression and inserts the pin into the vertebral body for level check. Utilizing hand held retractors, anterior vertebral column and the adjacent longus coli muscles are exposed. At least 24 mm exposure provides comfortable insertion of the retractor. Longer exposure makes retractor insertion easier. A Caspar pin (Aesculap Inc., Pennsylvania) is placed on the rostral or caudal vertebrae of the exposed level, however is not tightened fully. After verification of the level, utilizing handheld retractors resting on the longus coli, at least 24x20mm space is opened. The appropriate medial retractor (with the choice of hook-like extension rostral or caudal) is inserted over the longus coli and slid under the pin.

Figure 3



Figure 3 - The Caspar distraction system is inserted, and the disc space is distracted

The pin is tightened afterwards (figure 2). The other pin and lateral retractor is inserted like the medial one, however requires less lateral retraction utilizing handheld retractor. After initial limited discectomy the distractor is inserted and the disc space is distracted for the next step of the procedure (figure 3). Following decompression phase, a spacer can be inserted while the retractor is in place. If a plate is used, the pins and retractor should come out before placement and fixation of the plate. In order to remove the retractor, the pin is loosened first. The retractor is slid out of the pin and gently taken out, keeping an eye on the hook-like extension of the retractor. The steps of the removal are opposite to the insertion phase.

Advantages and Limitations

Simplicity of the retractor application is the main advantage of the device. It provides adequate exposure for single level anterior cervical discectomy. The retractor can be placed without further bone preparation including removal of the osteophytes. Fixation to the vertebrae and sitting over the longus coli (rather than under) provides stability of the retractor with no concerns about the longus coli muscle stretches or tears and subsequent increased further separation of the blades. The design lets the distraction happen or get adjusted while the retractors are fixed to the vertebrae. The retractors can be made partially or totally from radiolucent polymers to improve intraoperative imaging of the cervical spine. The convenience, safety and simplicity of the retractor is accompanied by some disadvantages as well. Osteopenia or loosening of the screws during surgery, can be problematic. The current design of the retractor does not allow the insertion of the plates. In order to insert the plates, the pins and retractors need to be removed and the plate inserted using handheld retractors.

Conclusion

The designed retractor system is simple and efficient for single level anterior cervical discectomy and its insertion is relatively easier. The effectiveness of the current retractor system compared with the others in various settings awaits evaluation through a randomized controlled trial.