A Modified Collar for Post Tracheal Resection Immobilization

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ABSTRACT

Objective: To determine and demonstrate the possible use of a modified cervical collar as an effective alternate immobilization technique post tracheal resection.

Methods: Two patients requiring tracheal resection for tracheal stenosis were identified as having been placed in an Aspen cervical collar brace with modification in the postoperative period to keep the patient's neck immobilized and flexed. Cervical collar braces usually keep a patient's neck in constant extension, but with our modifications we keep the neck in constant flexion. This method was used in lieu of the traditional "chin stitch" to relieve tension on the tracheal anastomosis in the immediate postoperative period. Patients were assessed during the inpatient postoperative period for comfort level, pain, and mobility in the collar. Patients were followed up as outpatients to evaluate tracheal patency.

Results: Both patients utilized the cervical collar for the duration of their inpatient stay. One patient had some complaints of difficulty breathing and increased anxiety due to the collar. Overall both patients found the collar tolerable and denied any pain due to the collar. Patients were followed after discharge from the hospital in the outpatient clinic, and neither patient had evidence of restenosis at 2-month follow up.

Conclusions: Though more research needs to be conducted, this approach represents a more comfortable yet still effective method of tracheal immobilization status post resection as compared to the traditional "chin stitch".

INTRODUCTION

The indications, technique, and peri-operative management of tracheal resection and re-anastomosis are now well-established in the literature since the first successfully transected and repaired trachea reported in 1884. In 1950, tracheal end-to-end anastomosis was reported to be safe at a maximal maneuver of 6.4 cm with primary anastomosis. One maneuver to keep the neck in flexion, at angles greater than fifteen degrees to relieve tension at the suture line. In order to maintain neck flexion, the literature has established the use of a "chin stitch" – a heavy suture placed midline from under the chin to the upper chest – for maintaining neck flexion, and foam wedges occupy the dead space between the posterior neck and the collar, keeping the patient in flexion. In the supine position, an additional foam positioning device is placed between the collar and the bed to further flex the patient's neck. Figure 1 illustrates the modified Aspen collar with and without the foam wedge. Patients are placed in the collar in the immediate postoperative period and kept in the collar for two to three weeks.

Between July 2005 and July 2007, two patients requiring tracheal resection for tracheal stenosis were placed in the modified Aspen cervical collar in lieu of the traditional "chin stitch" in the postoperative period. Patients were assessed during the inpatient postoperative period for comfort level, pain, and mobility in the collar. Patients were also followed as outpatients to evaluate tracheal patency and monitor for possible complications at the site of anastomosis. We retrospectively reviewed the clinical data of these patients.

RESULTS

The first patient was a 21 year old male with a history of anoxic brain injury secondary to drug overdose in 2005 resulting in a prolonged period of intubation and eventual tracheostomy. He underwent tracheal resection with primary anastomosis in 2006 due to a complete stenosis that was thought secondary to his prolonged intubation. Following tracheal resection, the patient was orally intubated, sedated and paralyzed and placed in the modified Aspen collar. He was fiber optically extubated on the second post-operative day without complication. During the hospitalization, the patient developed a positive Clostridium difficile, but his airway remained stable. He underwent flexible bronchoscopy on post-operative day nine which revealed a healing anastomosis. The patient remained in the cervical collar for the remainder of his stay, till post-operative day fourteen when he was transferred to a rehabilitation facility. Figure 2 shows the collar with foam positioning devices around the patient. Throughout his stay the patient remained in flexion and had no pain associated with the collar. At two months follow-up, the patient continued to do well with regards to the tracheal anastomosis and showed no signs of recurrent stenosis.

The second patient was a 36 year old female who developed severe tracheal stenosis following prolonged intubation. Due to the severity of stenosis, initial management consisted of tracheotomy with subsequent tracheal resection and primary anastomosis. She was fitted with the modified Aspen collar post-operatively. Her hospital course was significant for mild anxiety on postoperative day 2 which was related to the collar. Despite her anxiety, the patient remained in the collar for the entire hospitalization and was discharged on post-operative day fourteen with instructions to wear the collar for an additional week. The patient was doing well at 2-month follow-up.

MATERIALS & METHODS

The collar was developed at Thomas Jefferson University Hospital by modifying an Aspen cervical collar brace (International Healthcare Devices, Long Beach, CA). The collar is created using a pediatric-sized Aspen front with an adult-sized Aspen back. The patient is placed within the collar in cervical flexion, and foam wedges occupy the dead space between the posterior neck and the collar, keeping the patient in flexion. In the supine position, an additional foam positioning device is placed between the collar and the bed to further flex the patient's neck. Figure 1 illustrates the modified Aspen collar with and without the foam wedge. Patients are placed in the collar in the immediate postoperative period and kept in the collar for two to three weeks.

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CONCLUSIONS

Both patients placed in the modified Aspen collar were maintained in cervical flexion for the duration of their hospitalization without significant complaints of pain, or immobility. Additionally, at two months after surgery, neither patient showed signs of stenosis at the anastomosis site.

While the literature indicates that the "chin stitch" does not cause patient discomfort, there are no formal studies looking at patient comfort and pain related to this stitch. Anecdotally, the senior author has noted significant discomfort associated with previous use of the "chin stitch." The use of a cervical collar to reduce neck movement is well reported in the orthopedic literature, though it is sparse on collars that explicitly keep cervical flexion. In the surgical literature, there is a case report of a neck brace used for flexion after sliding tracheoplasty, with no report of post-operative complication or discomfort due to the brace. Further research is necessary to establish the efficacy of a cervical collar in maintaining neck flexion status post tracheal resection. Though more research needs to be conducted, this approach represents a more comfortable yet still effective method of tracheal immobilization status post resection as compared to the traditional "chin stitch."

REFERENCES