The Fate of Medialized Cartilage in Thyroplasty Type I

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Thyroplasty type I is rapidly emerging as the preferred means of medializing a paralyzed vocal fold. We discuss our experience with the fate of a medialized cartilage window 9 months after an otherwise successful operation. Cartilage resorption over time resulted in degeneration of voice and in progressive aspiration. We recommend removing the cartilage window rather than medializing it, in the interest of stabilizing the degree of long-term vocal fold medialization. (Arch Otolaryngol Head Neck Surg. 1994;120:1398-1399)

Thyroplasty type I is an excellent method of medializing the vocal fold in patients with unilateral paralysis. The reported advantages over Teflon augmentation include (1) patient cooperation with local anesthesia without the need for topical direct laryngoscopy; (2) maintenance of neutral head position to better judge voice quality at the time of surgery; (3) ability to adjust the medializing force, thus "fine tuning" the final position of the paralyzed vocal fold; (4) preservation of the mucosal wave; (5) potential reversibility of the procedure; and most importantly (6) the allowance for future neuromuscular recovery.

The thyroplasty technique used by one of us (C.T.S.) and based on that advocated by Ishikii et al has been well described previously. An inferiorly based perichondrial flap is raised over the proposed window site. A window is then cut in the thyroid cartilage using a fine-side cutting dental bur. After the inner perichondrium is raised, a snugly fit Silastic block is used to depress the thyroid cartilage window, thus medializing the vocal fold. Minor dimensional adjustments in the block are executed to produce the best maximum phonation time (MPT). The perichondrial flap is then returned to its position and sutured, thus anchoring the block medially. The wound is closed in layers.

That the Silastic block is well tolerated is demonstrated by the following observations. In one of the few animal studies, Escajadillo reported that Silastic blocks produced minimal fibrotic reactions and were easily removed from dogs after a 2-month period. Isaacson et al, in a histologic examination of the larynx of a patient who died 1 month after undergoing thyroplasty, found no evidence of intralaryngeal hemorrhage or scarring and noted a lack of scarring around the Silastic implant. Little is known concerning the fate of the medialized cartilage window.

Stability of the structure of the window is critical to the stability of operative results. The following case report describes cartilage resorption with subsequent degradation of voice quality and, therefore, suggests a revised operative technique be used in the future.

REPORT OF A CASE

A 64-year-old man presented in January 1991 with prostate cancer that had metastasized to the right side of the neck, above the clavicle, and to the mediastinal lymph nodes, resulting in left vocal fold paralysis. The patient complained of aspiration and dysphonia. On endoscopic examination, excessive pooling of secretions in the piriform sinuses and consistent aspiration on adductive postures were apparent. Breathy vocal quality was characterized by reduced pitch and intensity range and marked reduction in MPT. Maximum phonation time measured at 3 seconds during normal effort levels. A left thyroplasty type I was performed according to
the method described earlier. A 5×10-
mm window was cut from the thyroid
ala and then depressed with a Silastic
block measuring 5×10×4×5 mm
(Figure 1, left). Glottic closure was
complete, resulting in reduced aspira-
tion and improved vocal quality.
Maximum phonation time obtained
during normal pitch and loudness lev-
els was 10 seconds.

Nine months later, the patient was
readmitted to the hospital for aspira-
tion pneumonia and breathy voice.
Glottic gap was apparent on endoscopic
examination with a recurrence of aspira-
tion. Maximum phonation time was
reduced to 2 sec-
onds. The patient was under-
went a re-
vision thyroplasty. After explant-
ing the Silastic block, a white
rectangular object, thought to be the
previously compressed thyroid car-
tilage window, was removed. A
larger Silastic block measuring
5×10×10×10 mm (Figure 1, right)
was placed in the window, the peri-
chondrial flap was returned to its pos-
tion, and the wound was closed.
Complete glottic closure was re-
stored, resulting in a reduction of as-
piration and an increase in MPT to
9 seconds. Gross examination of
the thyroid cartilage window revealed
a firm, rubbery, rectangular tissue
measuring 5×3×2 mm thick. His-
tologically hyaline cartilage re-
placed fibrous tissue and a few ar-
eas were ossified (Figure 2).

Although Isaacson et al demonstrated
no change in the histologic appearance
of the medialized cartilage window 1
month after undergoing thyroplasty,
we report dramatic changes 9 months
postoperatively. In our patient, degen-
eration of cartilage produced degra-
dation in glottic competence. Restor-
ing complete glottic closure, vocal
quality, and MPT to previous values
required increasing the depth of the
revised Silastic block by 6 mm, the
approximate thickness of an adult male
thyroid ala. That most patients who
have undergone thyroplasty type I re-
main stable long term strongly sug-
gests that the medialized cartilage
windows remain structurally stable.
However, we suggest that cartilage
degeneration may result from inadvert-
ent separation from the supporting in-
ner perichondrium, postoperative
wound infection, or excessive pressure
of an oversized Silastic block against
the medialized cartilage window. Al-
though not yet substantiated, we be-
lieve that ossified windows may be
more vulnerable to such forces than
cartilaginous ones.

This case report provides the basis
for our recommendation to re-
move the cartilage window to im-
prove the long-term stability of voc-
al fold medialization. Although
removing cartilage theoretically in-
creases the possibility of airway pen-
etration and extrusion of Silastic,
such an event has not occurred in
our series to date.

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