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Clinical course of acute laryngeal trauma and associated effects on phonation

S. Brosch, H. S. Johannsen

Abstract

We report the clinical course of blunt laryngeal trauma in three young patients. All three patients underwent several phoniatric examinations as well as indirect microlaryngoscopy and microstroboscopy. The follow-up period ranged from three to eight months. In the first case, there was isolated haemorrhage of the left vocal fold; in the second, dislocation of the arytenoid cartilage with formation of an adhesion in the area of the anterior commissure; and, in the third, non-dislocated fracture of the thyroid cartilage with development of haematoma in the right hemilarynx and transient vocal fold paralysis. One patient required surgical treatment; however, repositioning of the arytenoid cartilage, attempted seven weeks following the injury, proved unsuccessful.

In conclusion, all three patients showed significant limitation of vocal fold vibration many months after trauma which was unrelated to the extent of resulting tissue damage. In all three cases, patients developed secondary posttraumatic functional dysphonia requiring treatment.

Key words: Larynx; Wounds, non penetrating; Rehabilitation, speech and language

Introduction

Clinical examination of patients immediately following acute laryngeal trauma often includes findings of limitations in vocal function. This is usually, however, of secondary importance, since emergency treatment focuses on stabilization of the airways, careful evaluation of the patient's injuries and planning of necessary surgical treatment (Schaefer, 1991). In cases of blunt laryngeal trauma resulting in no major injuries to the cartilage, conservative measures, such as administration of corticosteroids and antibiotics, resting the voice and use of a vaporizer, represent the therapy of choice.

A review of the literature on acute laryngeal trauma reveals that only a few authors make more than passing reference to the mid- to long-term effects of laryngeal trauma on phonation (Ogura, 1975; Hirano *et al.*, 1985; Stanley *et al.*, 1987). Even in reports of large patient groups, findings relative to vocal function were given as 'good' or 'fair results' (Bent and Porubsky, 1994) or were not mentioned at all (Delaere and Feenstra, 1995). The objective of the present investigation was to prospectively study the possible effects of blunt laryngeal trauma on phonation and present their clinical course on the basis of clinical findings.

During the last year, three young patients presented to our department for treatment of blunt laryngeal trauma. Findings at clinical examination and follow-up have been documented prospectively with particular attention to phonation. One patient presented immediately following her injury, a second four days following trauma, while the third was referred for initial evaluation during the sixth post-traumatic week. All three patients underwent phoniatric examinations as well as indirect microlaryngoscopy and microlaryngostroboscopy. All patients initially received a single intravenous dose of 100-250 mg of prednisolone and antibiotics over the course of several days. The follow-up period ranged from three to eight months.

Case reports

Case 1

A 23-year-old female cyclist collided with an unexpectedly opened automobile door. Hurled over the handlebar of the bicycle, she was thrown against the upper part of the door frame. A speech therapist, the patient was admitted immediately after the accident complaining of severe hoarseness. Seen by us the same evening, she was referred the next day for ambulatory treatment in our outpatient phoniatric department.

Laryngoscopy revealed an area of haemorrhage covering the entire left vocal fold and slight swelling of the same cord (Figure 1).

A few days later, although the haematoma had been in large part resorbed (Figure 2), microlaryngostroboscopy revealed that vibrations in the fold were still very irregular and partially antidromic when compared with the contralateral fold.

The vibrational function of the left vocal fold was generally restricted. At the time of the last follow-up examination eight months following the trauma, the patient still suffered from functional dysphonia due to vocal malcompensation which required ongoing therapy.

From the Section for Phoniatrics and Pediatric Audiology, University Otorhinolaryngological Clinic, Ulm, Germany.
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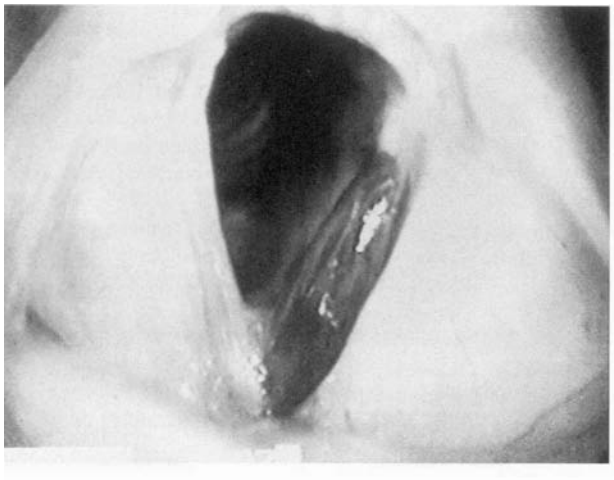

FIG. 1

Findings of microlaryngoscopy on the day after trauma with swelling and significant haematoma of the left vocal fold.

Microlaryngoscopy returned normal findings and no lateral difference was recognizable (Figure 3), although the fine vibrational pattern of the left fold remained irregular.

The patient continued to receive speech therapy with the objective of restoring a relatively robust and loud voice.

Case 2

In the second case, a 22-year-old male was referred by an external otorhinolaryngological clinic for treatment six weeks after sustaining blunt laryngeal trauma. The man, who had been involved in a motor vehicle accident and was not wearing his safety belt, was thrust frontally against the steering wheel with his larynx. The primary ENT specialist documented a large haematoma of the right side of the larynx and oedema over the right arytenoid cartilage. Computed tomography (CT) examination excluded fracture of the larynx. Complaints at the time of referral consisted of hoarseness and exertional dyspnoea. Laryngoscopy revealed paralysis of the right vocal fold, which was in paramedian position, and a ventrally dislocated arytenoid cartilage, a granuloma in the area of the right vocal process and adhesion formation at the anterior commissure (Figure 4).

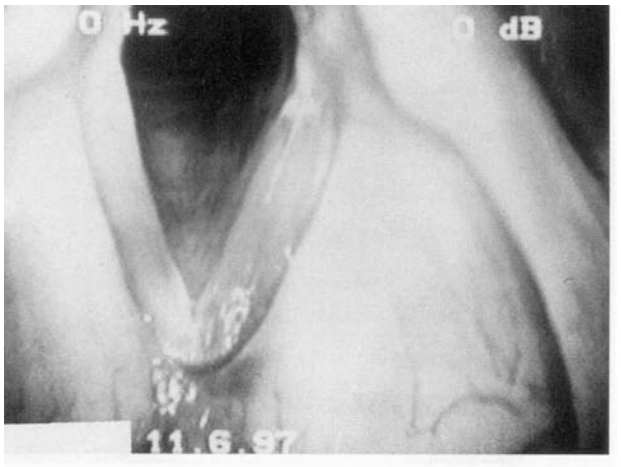

FIG. 2

Findings of microlaryngoscopy eight days after trauma. The haematoma of the left vocal fold is mostly resorbed, although the left vocal fold seems somewhat oedematous in comparison with the contralateral fold.

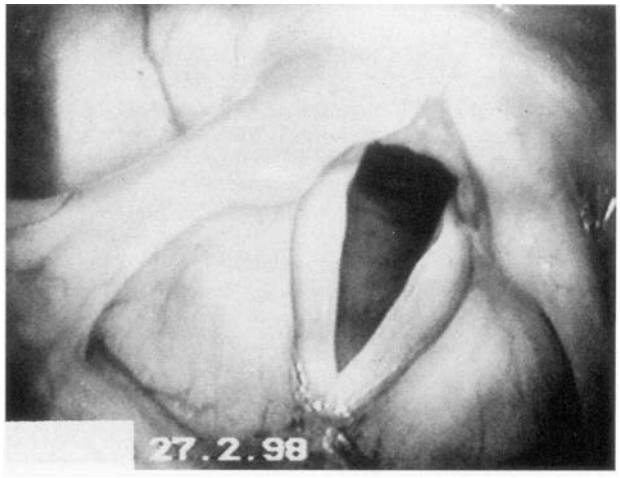

FIG. 3

Normal findings at microlaryngoscopy eight months after trauma. Lateral difference between the vocal folds is no longer visible.

We recommended repositioning of the arytenoid cartilage and surgical excision of the granuloma under endotracheal anaesthesia. This procedure, however, had no positive effect on phonation and the patient was referred for speech therapy. The patient was last seen three months after sustaining his injury. The arytenoid cartilage remained dislocated and the broad adhesions of the vocal folds remained unchanged (Figure 5).

The voice remained significantly hoarse and strident. We recommended that the patient undergo laser surgery to dissolve the adhesion. Following the procedure, however, the patient was unfortunately lost to follow-up.

Case 3

A 35-year-old man tripped while climbing stairs and stuck the angle of the thyroid cartilage on the edge of a step. The patient presented for initial, emergency treat-

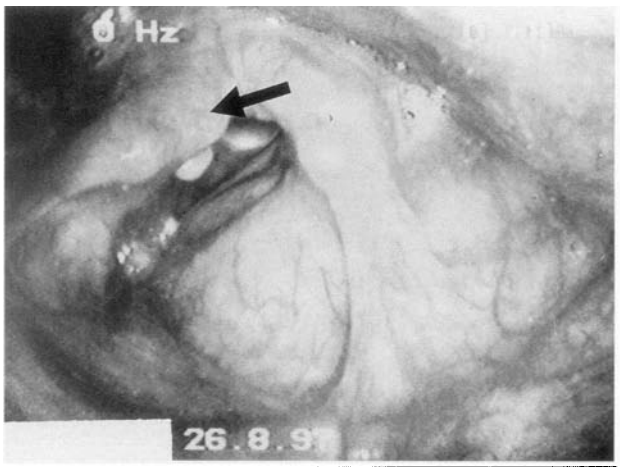

FIG. 4

Findings at microlaryngoscopy six weeks after blunt laryngeal trauma. There is ventral dislocation of the right arytenoid cartilage (arrow) and there is a small, functionally insignificant granuloma on its vocal process. There is adhesion of the vocal folds in the area of the anterior commissure.

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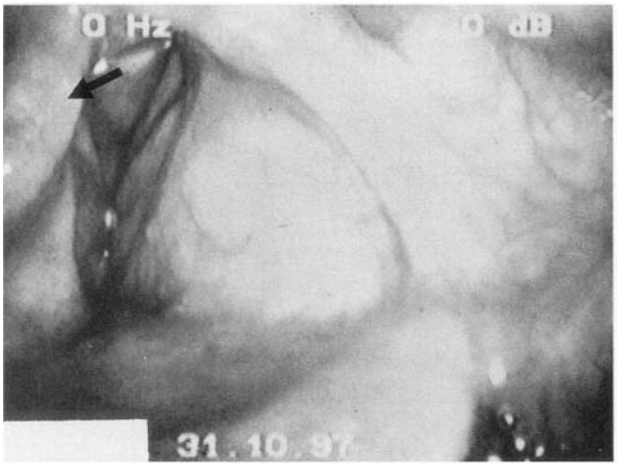

FIG. 5

Laryngoscopic findings three and a half months following trauma and eight weeks following attempted repositioning of the arytenoid cartilage. The right vocal fold remains paralysed and the arytenoid cartilage (arrow) has again been ventrally dislocated.

ment in our clinic four days later, complaining of severe pain while swallowing, hoarseness and inspiratory stridor and was seen by us on the same day. Laryngoscopy revealed a large, right-sided haematoma of the larynx and hypopharynx, as well as paralysis of the right vocal fold. Emergency CT of the neck verified a non-dislocated fracture of the thyroid cartilage (Figure 6).

Surgical treatment was not required. As part of ambulatory follow-up in the outpatient department of phoniatrics, the patient was examined eight days after sustaining his injury. At this time, the haematoma had already been partially resorbed (Figure 7).

Three months after the trauma, the general mobility of the right vocal fold had been completely restored, though significant lateral difference between the vocal folds remained (Figure 8) and microlaryngostroboscopy revealed that the fine vibrational pattern in the right fold were reduced in comparison with the contralateral side.

The patient remains unable to sing or shout. Because of time constraints, the patient has not yet participated in the recommended speech therapy.

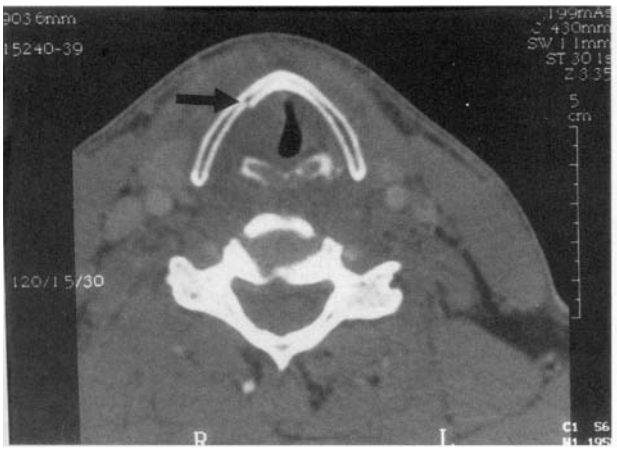

FIG. 6

Computed tomography reveals a non-dislocated fracture of the internal lamina of the right thyroid cartilage (arrow). The narrowing of the glottal opening is the result of a large haematoma of the right hemilarynx with transient reduction in the motility of the right vocal fold.

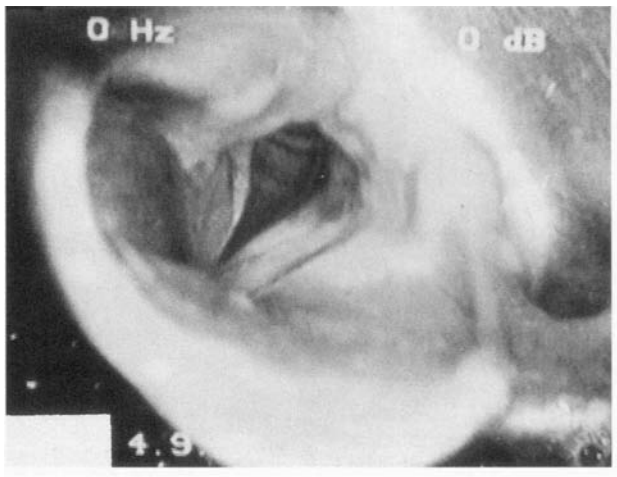

FIG. 7

Findings at microlaryngoscopy eight days after trauma. The haematoma is partially resorbed and the right vocal fold has regained mobility. Both vocal folds remain somewhat swollen.

Discussion and conclusions

Review of the three cases of blunt laryngeal trauma reported above will show that even minor injuries to the larynx may be followed by secondary difficulties in phonation. The statement, 'if surgical treatment is not required, the results for airway and voice are generally excellent', as one publication from the year 1983 postulates regarding acute laryngeal trauma, would seem to be seriously contradicted by our observations (Leopold, 1983). Rather, it seems advisable that all patients, including those whose injuries seem insignificant at first, be referred promptly for phoniatric evaluation. Our experience shows that many patients require speech therapy in order to reduce the risk of secondarily disturbed vocal compensation and avoid permanent restrictions of phonation. The reports of these three cases, however, also show that systematization of the sequelae of blunt laryngeal trauma is elusive: rather, such injuries must be recognized individually, evaluated and subjected to appropriate therapy.

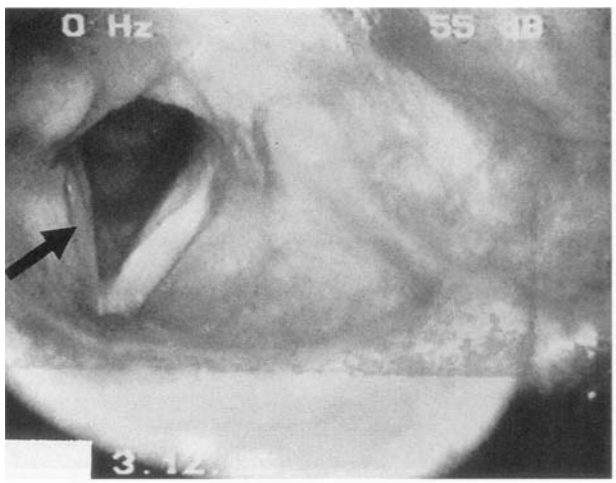

FIG. 8

Findings at microlaryngoscopy three months following injury. The right vocal fold seems thinner along its entire length than the contralateral fold.

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Address for correspondence:
Sibylle Brosch, M.D.,
Section for Phoniatrics and Pediatric Audiology,
University Otorhinolaryngological Clinic,
Schillerstraβe 15,
D-89070 Ulm, Germany.

Fax: 0731/502-1702
e-mail: sibylle.brosch@medizin.uni-ulm.de