For the CANDIDATE

CLINICAL SCENARIO
A 45 years old female patient presents with hoarseness and gentle voice. The onset was sudden one week ago and remained stable thereafter. Breathing was not impaired.
Indirekt Laryngoscopy shows unilateral laryngeal paralysis of the right side.

Question 1: (40%)
What could be the Etiology?

For the EXAMINER

Blue Print:
Diagnosis, Differential Diagnosis and treatment of unilateral laryngeal paralysis.

by Angelos Nikolaou

Question 2: (30%)
What examinations would you perform?

Question 3: (30%)
What treatment would recommend? Short-term and long-term after 6-12 months?

What clinical Examination would you perform:?
The candidate should include
palpation of the neck,
Sonography of neck including thyroid gland
CT (or MRI?) of cervical area, skull base, upper thorax and mediastinum
What further investigation would you perform?
Panendoskopy?
Pet-Scan?

Treatment: (see background informations, next side)
Treatment of possible tumors.
If Idiopathic: Steroids? Logepedics?
Waiting for 6-12 months for spontaneous recovery?
Different operative options:

In case of bilateral paralysis: Stridor, dyspnoea, aspiration etc
Treatment: Intubation, tracheotomy, several methods of laterization of the vocal cord later, when the situation is permanent.

Laryngeal Paralysis

The symptoms of laryngeal paralysis vary greatly. Occasionally, unilateral laryngeal paralysis is noted during routine examination of a patient with no voice or airway complaints. But most patients with unilateral laryngeal paralysis are hoarse, due to inadequate glottal closure during phonation. In some patients, glottal closure is so poor that aspiration occurs during swallowing. With bilateral paralysis, the dominant symptom is usually stridor that results from inadequate laryngeal opening during inspiration. It is very important to diagnose the cause of laryngeal paralysis.

Etiology:

Cancer: lung, thyroid, esophagus, other
Surgery: thyroidectomy, cervical spine
Cardiovascular: aortic aneurysm, cardiac hypertrophy, and so forth.
Inflammatory: collagen vascular disorders, sarcoidosis, Lyme disease, syphilis
Central lesions: Arnold-Chiari malformation. Isolated laryngeal paralysis due to other central lesions (such as stroke) is rare
Idiopathic: in about 20% of cases

Treatment for unilateral paralysis:

Goal is to improve glottal closure
Voice therapy
Injection laryngoplasty: Many substances can be injected into the paralyzed vocal fold to restore glottic competence. Injection can be performed via direct laryngoscopy, under local or general anesthesia, or in the office, through the mouth, or through the neck. The ideal substance would be well tolerated and permanent. Currently, no injectable substance is ideal for the treatment of laryngeal paralysis.
Teflon injection was the most widespread treatment through the 1970s. Its short-term efficacy is excellent, but granulomas eventually developed in many patients, so that other treatments became preferable.
Gelfoam, formed into a paste, is a temporary, off-label treatment. It has been reported to be effective for 8 to 10 weeks and is used in patients with a chance for recovery.
Autologous fat may be harvested by liposuction or excision. Reports of survival of injected fat are variable. Some report that it dissipates within a short time, while other reports indicate long-term survival.

Type II thyroplasty (medialization laryngoplasty):

This procedure is usually performed under local anesthesia, so that vocal results can be monitored during the procedure. The vocal fold position can also be moni-tored intraoperatively with a transnasal fiberoptic laryngoscope.
A cartilage window is removed from the lower thyroid ala, at the level of the vocal fold. A pocket is dissected deep to the cartilage and an implant is placed to push the membranous vocal fold medially, adjusting the size and position of the implant to achieve optimal voice. Isshiki originally described carving the implant from a Silastic block. Some preformed implants in various sizes are commercially available, constructed of Silastic or hydroxylapatite. More recently, many have layered a Gortex strip into the pocket.

Complications:
Postoperative airway obstruction due to edema
Late extrusion of implant
Failure to achieve adequate voice
Most common need for revision: implant is too high or too anterior. Implant may be effective intraoperatively, but proves to be too small after resolution of opera-tive edema or subsequent muscle atrophy.
Medialization laryngoplasty is not effective for patients with flaccid paralysis and a large, posterior gap, or with vocal processes on different levels.

Arytenoid adduction:
This procedure mimics the action of the lateral cricoarytenoid muscle, to rotate the vocal process of the arytenoid cartilage back to the midline. It is indicated in uni-lateral laryngeal paralysis for the patient with a large glottal gap that cannot be corrected by injection or medialization laryngoplasty. It may be performed in combination with either of the other procedures.'°
Arytenoid adduction is usually performed under local anesthesia, so that the voice and position of the vocal fold can be monitored intraoperatively, and the vocal fold can move unimpeded by an endotracheal tube.
The objective to place a suture in the muscular process of the arytenoid cartilage and to apply tension anteriorly, securing the suture to the anterior thyroid ala. The muscular process can be exposed by rotating the larynx toward the opposite side, transacting the attachments of the inferior constrictor muscles to the thyroid ala, and reflecting the pyriform fossa mucosa off the arytenoid. It is sometimes necessary
to remove a portion of the posterior thyroid ala. Another approach which has been described is to create a window in the posterior thyroid ala.

Laryngeal reinervation. Most commonly, a branch of the ansa cervicalis is anastomosed to the distal RLN. An alternate approach is to use a neuromuscular pedicle. Reinnervation by either technique is reported to restore bulk and tone to the reinnervated muscles, but not functional motion.

Treatment for Bilateral Laryngeal Paralysis

Goal is to improve airway, with minimal impact on voice. Diagnosis must include differentiating paralysis from fixation due to scar tissue or arthritis. Electromyography (EMG) may aid in this differentiation, but definitive diagnosis requires direct laryngoscopy with palpation of the vocal fold.
Tracheotomy is the gold standard for relief of obstruction. Speech is still possible with digital occlusion of the tracheotomy tube or use of a Passy-Muir valve.
Static lateralization of one or both vocal folds by:
Arytenoidectomy, external or endoscopic. This may be total, medial only, or subtotal.
Endoscopic cordectomy, cordotomy, or suture lateralization,
Arytenoid abduction by external approach.
Reinnervation by nerve muscle pedicle, ansa cervicalis, or phrenic nerve transfer.
Experimental results are promising, but clinical results are poor.
Laryngeal "pacing" with an implantable stimulator is still experimental.