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Left recurrent laryngeal palsy after left total hip arthroplasty ; Stretch injury due to inappropriate positioning in the lateral approach ?

C. V. M. VERHAGEN[1], W. I. M. VERHAGEN[1] and G. J. VAN NOREL[2]

Department of Neurology[1] and Orthopedic surgery[2], Canisius-Wilhelmina Hospital, Nijmegen, the Netherlands

Abstract

An 80-year-old man is described with a left-sided recurrent laryngeal nerve palsy after primary total hip arthroplasty. Intubation was uncomplicated. Aetiology is discussed. It might be caused by intubation injury, stretch-induced injury due to cervical hyperextension or inappropriate positioning during surgery in the lateral approach or a combination.

Key words : Recurrent laryngeal palsy ; total hip arthroplasty ; stretch injury.

Introduction

Nerve injuries are not uncommon after primary total hip arthroplasty. Especially the sciatic, femoral superior gluteal and obturator nerve are involved, but in 0.22% upper extremity palsies were identified, mainly the ulnar nerve but also the brachial plexus (Posta *et al*., 1997). Vocal cord paralysis resulting in hoarseness is an important complication in surgery, especially in thyroid gland surgery. Hoarseness can also be the result of damage to the vocal cords itself resulting in oedema, haematoma or granuloma. Recurrent laryngeal nerve (RLN) palsy is also seen as a complication of intubation. At last it can be the result of a neural lesion without clear morphological findings.

We present a case with hoarseness as an uncommon complication of total hip arthroplasty.

Case report

Because of degenerative arthritis of the left hip an 80-year-old man got primary total hip arthroplasty under general anaesthesia with endotracheal intubation. The lateral approach was used. Except for a colonectomy at the age of 50 for colon carcinoma the medical history was unremarkable. Intubation was uncomplicated.

Postoperatively he was suffering from hypophonic hoarseness. He also had tendomyogenic neck pain with muscle tenderness on the left side. There were no other complaints. Initially hoarseness was thought to be a result of oedema of the vocal cords. His neck pain disappeared in a few days.

After nine weeks there was no clinical improvement. Laryngoscopy revealed a paralysis of the left vocal cord. The left vocal cord was in paramedian position. The general, ENT and neurological examination were otherwise unremarkable. There were no abnormalities on CT scans of the thorax and larynx. Therefore it was decided to wait and see. Speech therapy was recommended. Two weeks later hoarseness diminished. After three months speech was normal. Laryngoscopy revealed normal moving vocal cords.

Discussion

To our best knowledge this complication has not been described before in patients with total hip arthroplasty. In adults with osteoarthritis total hip arthroplasty can be done with a posterior or lateral approach. The risk of nerve injury taken the different nerves in the leg together (superior gluteal nerve, obturator nerve, femoral nerve and sciatic nerve) is higher among the direct lateral approaches, but comparing the risk nerve by nerve there were no significant differences. According to Jolles and Bogoch in their Cochrane review (2006) there are insufficient data to make any firm conclusion on the optimum choice of the approach, not only related to the risk of nerve injury. They did not mention other types of nerve injury in their review.

Post-operative hoarseness is frequently seen after intubation anaesthesia. Jones *et al.* found postoperative hoarseness in 32% and persisting for more than 1 week in 3% (Jones *et al.*, 1992). Others mentioned larynx lesions after intubation in about 6% (Kambič and Radšel, 1978 ; Peppard and Dickens, 1983). In a prospective study Friedrich et al noticed transient intubation related recurrent nerve palsy in 1.4% and permanently in 0.5%

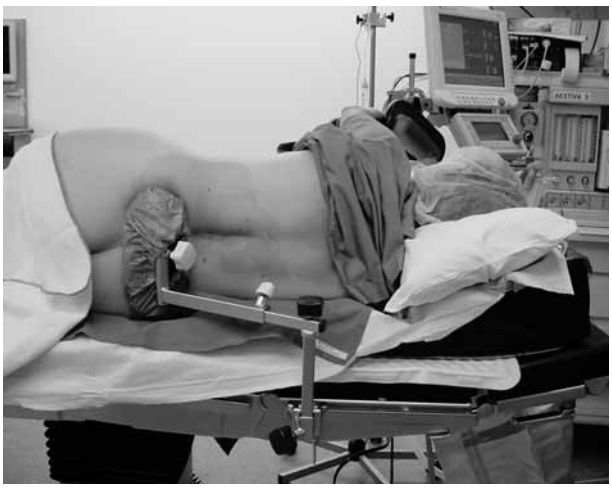

FIG. 1. — The optimal postion of the patient in the lateral approach.

(Friedrich *et al.*, 2000). During intubation the left vocal cord seems more at risk than right because of the tube direction during intubation by right-handed people (Peppard and Dickens, 1983). Other explanations are the possibility of high cuff pressure or stretch-induced nerve injury. The laryngeal muscles are innervated by two branches of the vagus nerve, the recurrent laryngeal nerve (RLN) and the superior laryngeal nerve (SLN). The SLN lies relatively deep in the neck, which protects it from direct injuries. The RLN leaves the vagus nerve in the chest and loops around the aortic arch on the left and around the subclavian artery on the right. This route puts the RLN at far more risk than the SLN, which explains the relatively high incidence of RLN injuries. Heinemann and Kalff (1982) suggested that stretch-induced injury due to hyperextension of the cervical spine might cause also RLN palsy ; they mentioned also lesions of the hypoglossal nerve. Peppard (1982) reviewed vocal cord paralysis resulting from non-surgical blunt trauma and found an increasing awareness resulting in a higher degree of recognition of this etiology in time. He described patients with transient vocal paralysis after strangulation injury, others reported patients with vocal cord paralysis after forced hand attack to the larynx and whiplash injury (Schroeder *et al.*, 2003 ; Brademann and Reker, 1998). Brademann and Reker (1998) described a patient with SLN paresis after whiplash injury and they suggested that the sitting position during the accident might be relevant. Liu *et al.* (1948) studied the effect of stretch on several peripheral nerves and they found histological signs of nerve damage starting at a mean stretch of 4.2% above the resting length. Another factor that might be important in stretch-induced RLN injury after total hip arthroplasty, is the positioning of the patient. For total hip replacement in the lateral approach the patient is positioned on the contralateral side after intubation. During surgery the head is hanging down over the shoulder, if it is not adequately supported. This might result in increased traction on the RLN ipsilateral to the replaced hip. It might be that RNL injuries after total hip arthroplasty have not been reported before, because they may be transient and recover early after surgery or were not evaluated. In that case one would assume that an intubation injury was the cause of the hoarseness (Myssiorek, 2004).

Concerning the medicolegal aspects it seems relevant that although the complication is probably uncommon, positioning of the cervical spine during total hip arthroplasty will be done in a way that traction on the peripheral nerves in that region is minimal by providing adequate support to the head and cervical spine.

In summary, the RLN injury in our patient might be caused by intubation injury, stretch-induced injury due to cervical hyperextension and/or inappropriate positioning during surgery or a combination. A definite etiologic diagnosis is not possible.

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Dr. Wim I. M. VERHAGEN, MD PhD,
Department of Neurology,
Canisius-Wilhelmina Hospital,
P.O. Box 9015,
6500 GS Nijmegen (The Netherlands).
E-mail : w.verhagen@cwz.nl