



Cervical lymph node biopsy – watch the nerves!

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To the Editor: Experience with the delayed diagnosis and severe consequences of accessory nerve injury following cervical gland lymph node biopsy prompted us to survey the practice of South African paediatric surgeons and to ascertain the incidence of accessory nerve injury.

Cervical lymph gland biopsies are often performed for diagnostic and therapeutic purposes and although spinal accessory nerve (SAN) injury seldom occurs, it remains a significant injury. The operation is relatively minor and cervical glands are commonly biopsied/removed in South Africa by junior doctors, registrars and general practitioners. The operation is often performed as a day case under suboptimal circumstances, despite the fact that it is common knowledge that posterior triangle nodular biopsy carries the risk of iatrogenic damage to the accessory nerve.

Although cervical adenopathy is a common finding in paediatric patients and is most often inflammatory in nature, specific 'red flags' could point to a more sinister diagnosis warranting lymph node biopsy. Lymph nodes more than 2 cm in diameter in children less than 12 years old are clinically significant and nodes persisting for more than 4 - 6 weeks despite adequate antibiotic treatment require diagnosis. Malignant nodes are often firm and large and persist after antimicrobial treatment, often with no associated signs or haematological abnormalities. Between 11% and 15% of biopsied cervical lymph glands harbour a malignant process.¹ Malignancy should therefore be suspected in the case of all rapidly growing or persistent lymph nodes, especially those in the supraclavicular and posterior cervical triangular region. Failure to arrive at a diagnosis leads to difficult clinical management decisions. Open surgery is therefore indicated for all large, solid and fixed nodes. With the development of new technologies, fine-needle aspiration (FNA) cytology may replace open biopsy in some cases. Removal or biopsy of these glands can be difficult, even in experienced hands, because of limited exposure, large adherent glands, their position in the posterior cervical triangle and the susceptibility of the SAN to iatrogenic surgical injury.² In adults the nerve measures only 1 - 3 mm in diameter. In children, the nerve is very thin and can easily be damaged and not even identified during nodal biopsy or removal.

Anatomical considerations

The SAN is regarded as the main motor nerve to the muscular trapezius, but it may receive motor innervation from other

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sources. C2, C3 and C4 make motor and sensory contributions and because of this injury to the nerve proximal to the junction beneath the proximal sternocleidomastoid muscle (SCM) may not produce paralysis of the trapezius muscle.²

It is important to evaluate the course of the SAN through the posterior triangle. The nerve leaves the skull through the foramen jugulare and lies close to the internal jugular vein. It then crosses the internal jugular vein and lies behind the stylohyoid and digastric muscle. It reaches the inferior surface of the SCM muscle and gives motor fibres to the muscle while passing underneath it or penetrating its deep component. The nerve then reappears under the posterior lateral edge of the muscle. At this point it is in a very superficial site. There is discrepancy in standard anatomical textbooks as to exactly where the nerve appears from behind the posterior border of the SCM. Possibilities are: (i) at the junction of its upper and middle parts; (ii) halfway down the posterior border of the muscle; and (iii) a little above the middle of the posterior border of the SCM; but (iv) never from behind the border of the upper third.

The exit is therefore not always constant. In the posterior triangle the nerve lies very superficially before it enters the trapezius muscle. A small branch from the transverse cervical artery may accompany the nerve or closely approximate its course. This superficial portion makes it particularly susceptible to injury during lymph node biopsy. Identification of the nerve as it traverses the posterior triangle is further compounded by the fact that it lies between the superficial and prevertebral layers of the cervical fascia and is surrounded by dense fascia, fat and lymphatic tissue. Variations in the anatomy of the nerve primarily involve the cervical contribution from C2, C3 and C4. The great auricular nerve exits at more or less the same point along the posterior margin of the SCM.^{2,4}

Biopsy technique

In children the whole or part of the lymph gland is preferred for diagnostic purposes. In addition to conventional investigations, pathology assessment requires enough tissue for touch imprints, electron microscopy and snap-freezing techniques. The removal of more than one gland enhances diagnostic accuracy.

Incidence

The nerve is very superficial in its course and is a thin anatomical structure in close juxtaposition to the deep posterior cervical lymph nodes. The incidence of SAN injury is between 3% and 10% following nodal biopsy. It is surprising that it is not damaged more frequently during gland biopsy. Large



nodes may displace the SAN, thereby increasing susceptibility to iatrogenic injury, i.e. traction, cauterisation and severance. Mere dissection, i.e. anatomical exposure of the nerve, can lead to trapezius denervation (12% of cases). This would make the anatomical isolation and even limited dissection of the SAN potentially hazardous. Hence our practice not to search specifically for the SAN during biopsy.⁵

Symptomatology

Despite numerous reports on the subject the injury is often overlooked, leading to extensive delays before nerve repair. In all cases the deficit is noted early by patients but often their complaints are not interpreted accurately by medical staff and the diagnosis can be delayed for weeks or even months. This delay time ranges from 6 weeks to 11 months, and in some cases even more than 2 years.³

Following lymph node biopsy, pain in the shoulder or axilla or in the occipital scalp may point to nerve damage. Shoulder drooping, trapezius atrophy, weakness of shoulder abduction and sensory disturbances are pointers to nerve injury. Shoulder and neck pain immediately following surgery can be regarded as an acceptable side-effect of a procedure done in the posterior triangle of the neck. Patients with SAN injury often develop a shoulder syndrome with dull non-localising pain exacerbated by movement of the shoulder, especially abduction, ongoing pain that may require medication, and physical problems pertaining to range of movement, strength and posture. SAN palsy may be mistaken for glenohumeral joint or muscular injury. Electromyography is used reliably to investigate the nerve damage.²

Management of nerve injury

Surgical options to repair the nerve damage include local or sural nerve grafts, end-to-end repair of the nerve, neurolysis, neurotisation (C2 - C3) and burial into muscle. Local or sural nerve grafts are reported to achieve pain relief and normalisation of shoulder posture in 77% of cases. When neurolysis can be performed, the results are excellent. When end-to-end repair is needed recovery can be expected in 75% of cases. Neurotisation or burial into muscle is far less successful.²

The natural history of SAN injury is dismal following minor surgical procedures in the posterior triangle of the neck.

The prognosis will depend on the type of nerve injury (i.e. complete v. partial) and the time delay before nerve repair is performed. This should preferably be done within 3 - 4 months of the injury. Recovery within 3 months is 100% but if surgery is done after 4 months excellent results are seen in 13% of cases, good results in 38% and poor results in 50%. However, favourable results have been reported with nerve repair as long as 1 year after injury.^{2,6}

Recommendations

We surveyed 5 medical officers and 10 paediatric surgeons about their practice with regard to removing glands from the neck. The general consensus was as follows: (i) there is no single mandatory technique – what is essential during the operation is that the nerve should not be damaged; (ii) it is a day-case surgical procedure; (iii) there is a need to be aware of the potential injury to SAN during nodal dissection; (iv) large nodes may surround or displace the accessory nerve; (v) FNA is only indicated if the nodes are matted or fixed and cannot be biopsied surgically; (vi) blunt dissection is critical – the gland should be carefully dissected away from the surrounding structures and the glandular capsule should not be ruptured; (vii) no special attempts should be made to identify the accessory nerve; (viii) blood supply to the gland should be controlled by pressure or very cautiously with bipolar cautery; (ix) no drains should be used after lymph node biopsy; and (x) wound sepsis may be seen occasionally.

We also surveyed the plastic surgeons and surgeons involved in nerve repair, and confirmed that there were no patients requiring nerve repair in the Western Cape. During the last 3 years we have performed 68 cervical node biopsies. Moore *et al.*¹ also had no SAN injuries (S Moore, Tygerberg Children's Hospital, 2005 – personal communication) in the series of 1 877 cervical lymph node biopsies they looked at to identify causes of gland enlargement in children. The common causes of lymph node enlargement in that series were neoplastic (11.6%), and tuberculous (25%). The remainder were benign.

In view of the literature available to us it is important to recognise that spinal accessory nerve injury is uncommon but can be a devastating consequence of a simple posterior cervical triangle lymph node biopsy. Nerve injury may result in medicolegal consequences. The possibility of nerve injury should be mentioned at the time of obtaining informed consent. The surgeon should be aware of the anatomical position of the SAN, the distortion of the nerve route due to altered anatomy and the safest techniques to remove or biopsy the posterior cervical gland for diagnosis. Iatrogenic accessory nerve injury must be avoided at all times. Postoperative follow-up should include assessment of possible nerve injury. Appropriate action should be taken if this is suspected.

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