CASE REPORT

Stab wound of the neck: potential pitfalls in management

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SUMMARY

The authors describe the case history of a patient who was stabbed in the back of his neck with a knife and who later presented with a Brown–Séquard syndrome attributable to cervical spinal cord damage.

Myelography and CT revealed a compressive extradural lesion shown at exploratory operation to be a loculus of cerebrospinal fluid (CSF). The loculus had formed as a consequence of leakage of CSF through a dural tear caused by the knife. Evacuation of this loculus resulted in some neurological improvement.

The necessity of obtaining a clear history and of performing a thorough clinical examination is explained. The need to admit patients in whom stab wounds of the neck have transgressed subcutaneous fat is reiterated. Early referral to a neurosurgeon is advised for those patients with neurological deficits.

INTRODUCTION

A recent report commented on the increase in the incidence of stab wounds observed in one United Kingdom accident and emergency (A&E) practice where stabbings of the head and neck comprised 15% of all stabbings (Swann et al., 1985). In a report from South Africa of a large series of stab wounds of the spinal cord (Peacock et al., 1977), 30% of spinal cord injuries involved the cervical cord, and in 84% of these cervical lesions incomplete transection of the cord was noted.

The management of such cases is controversial. The largest reported experience is from South Africa where superficial wound toilet and antibiotics are recommended as initial management—provided there is no retained foreign body, sepsis or a cerebrospinal fluid (CSF) leak persisting for 3–4 days. Neurological deficit is not taken as an
indication for surgical exploration per se (Lipschitz & Block, 1962; Lipschitz, 1976; Peacock et al., 1977). Schmidek (1985) has questioned the propriety of initial management along the lines of the South African experience and advocates immediate surgical exploration in the presence of a neurological deficit.

CASE REPORT

A 20-year-old man presented to the A&E department following a fight during which he was stabbed. It was noted that he had a small (1.5 cm) stab wound in the posterior aspect of the base of his neck, to the right of the second thoracic spinous process. No neurological deficit was noted, but the patient was drunk at the time, and when a chest X-ray failed to reveal any intrathoracic lesion the wound was sutured and the patient discharged.

The following day he returned, complaining that his right leg was weak and that his left leg felt abnormal, so that he had difficulty in walking. On examination power was reduced in the right foot, eversion and great toe extension being 4/5 (MRC grading). Pain sensation was decreased below the level of T4 on the left side and he had a partial right Horner’s syndrome. Joint position sense, coordination and reflexes were normal. He had a distended, palpable bladder and, since the patient had not passed urine since the assault, a urinary catheter was inserted. Plain X-rays of the chest and cervical and upper thoracic spine were normal. The provisional diagnosis was that of a partial Brown–Séquard syndrome secondary to stab injury of the cervical spinal cord.

Myelographic examination revealed displacement and compression of the cervical cord from a posteriorly situated extradural space-occupying lesion extending from the level of the first cervical vertebra to that of the first thoracic vertebra (Fig. 1). There also appeared to be a mass lying anterior to the cervical cord, displacing it posteriorly. A CT scan demonstrated that the cord was in fact compressed by an anteriorly situated fluid collection. Contrast was seen to leak out of the spinal subarachnoid space, indicating the presence of a dural tear. Additional contrast was observed in the right C7–T1 exit foramen (Fig. 2).

Surgical exploration of the cervical spinal cord was advised since the neurological deficit appeared to have increased and the radiological demonstration of spinal cord compression suggested that this deterioration might be secondary to accumulation of an extradural CSF loculus or haematoma. Under general anaesthesia, in the prone position, the cervical and upper thoracic spinal cord was exposed via a midline cervicothoracic incision, separate from the stab wound (Fig. 3). It was immediately apparent that CSF was leaking from the right side at the level of the second thoracic lamina (T2). A C7–T1 laminectomy was performed to reveal a longitudinal tear in the dura at C7 vertebral level on the right (Fig. 4). On opening the dura in the midline away from the point of entry of the knife blade, it could be seen that the C8 roots were protruding through the dural tear but there was no obvious damage to the cord or nerve roots. The tear was repaired with fascia from the wound margins and the wound thoroughly cleaned. No foreign bodies were found. Routine closure of the wound was accompanied by administration of prophylactic antibiotics.
Fig. 1. Cervical myelogram (lateral view) showing displacement and compression of the spinal cord by an extradural collection both anteriorly (arrow heads) and posteriorly (arrows).

Fig. 2. Computerized axial tomogram (CT scan) at the C7–T1 vertebral level. The arrow indicates contrast material leaking through the right spinal nerve root exit foramen.

Fig. 3. The surgical exposure: an extensive midline cervicothoracic exposure is necessary to identify the site of dural penetration. Note the small stab wound (arrow).

Fig. 4. The dura overlying the cervical spinal cord has been opened. There is no obvious laceration of the neural elements but the dural tear (arrow) is large enough to admit the tip of a suction tube.
The patient made an uncomplicated post-operative recovery. The urinary catheter was removed and on discharge he could walk, albeit with a limp of his right foot, but the left-sided sensory changes persisted. On review 6 weeks later the right Horner's syndrome persisted but he had regained full motor power in his right foot. Although there was some recovery of sensation over the left half of his trunk and left leg, this was incomplete. He was still slightly unsteady when trying to balance, particularly when standing on the right leg.

DISCUSSION

Most surgeons advocate immediate exploration of the spinal cord wound when it is clear that a foreign body (including a retained tip of the knife blade) is present, a CSF leak persists for several days, or there is progressive neurological deterioration (Lipschitz, 1976; Peacock et al., 1977; Schmidek, 1985). This patient fell into the last-mentioned group, although it is possible that the neurological deficit was initially missed by a cursory examination in an inebriated, uncooperative patient. The difficulties encountered in obtaining an accurate history and the need for careful examination in such patients have been stressed previously (Herr & Barrett, 1987). There was no difficulty in justifying exploration of the spinal cord by laminectomy since the myelographic and CT findings suggested that an extradural compressive lesion was responsible for the patient's deterioration. At operation, it transpired that the extradural lesion was a loculus of cerebrospinal fluid (CSF), presumably produced by a ball-valve effect of the dural laceration caused by the knife blade tip. Evacuation of the CSF loculus was followed by neurological improvement.

In the cervical region spinal cord injuries caused by stab wounds are predominantly of the hemisection type, presenting with the clinical picture of a Brown–Séquard syndrome. In its classical form this is characterized by ipsilateral motor weakness (corticospinal tract damage) and ipsilateral posterior column damage with loss of joint-position sensibility and sensitivity to tactile discrimination and vibration below the level of the lesion. Destruction of the ipsilateral lateral spinothalamic tract results in contralateral analgesia and thermoanaesthesia a few sensory segments below the level of the lesion (Walton, 1977). Damage to sympathetic fibres in the cervical cord above the level of D1 results in an ipsilateral Horner's syndrome. Such patients tend to make a good, if incomplete, recovery during the following 6 months (Peacock et al., 1977). It is important to remember, however, that the clinical picture may vary somewhat (Lipschitz & Block, 1962; Peacock et al., 1977).

Those who advocate a conservative policy of primary closure after superficial wound toilet and prophylactic antibiotics point to the relatively low incidence of meningitis (4%) (Lipschitz, 1976; Peacock et al., 1977). In this and similar reported series, no account appears to have been taken of those patients who may have been discharged from primary care and lost to follow-up. Therefore an incidence of 4% for meningitis is almost certainly an underestimate. Thus in another report concerning stab wounds in the region of the craniocervical junction, conservative management along the lines stated above resulted in a much higher incidence of meningitis (approximately 50%) (De...
Villiers & Grant, 1985). The incidence of meningitis following cervical laminectomy is difficult to estimate, but deep infections complicating laminectomy occur in no more than 1% of cases (Haines & Goodman, 1982; Schmidek, 1985; Tenney et al., 1985; Mollman & Haines, 1986).

Not all foreign bodies (even metallic ones) are evident on an anteroposterior view of the spine such as is obtained on chest X-ray. Views in several planes are essential (Peacock et al. 1977). A retained knife blade tip may cause neurological symptoms many years after the injury (Jones & Woosley, 1981).

We would agree that patients with stab wounds of the neck in which subcutaneous fat has been lacerated should be admitted for observation (Swann et al., 1985), as this implies that the knife has penetrated to a considerable depth.

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REFERENCES