

Symptoms and Signs of Irritation of the Brachial Plexus in Whiplash Injuries

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FROM ABSTRACT

We investigated the incidence of evidence of irritation of the brachial plexus in 119 patients with whiplash injuries sustained in road-traffic accidents.

We compared the symptoms, physical signs, autonomic status, psychological status and findings from radiographs of the cervical spine using examination charts and a modified Cornell Medical Index Health questionnaire, in patients in two distinct groups: those with irritation of the brachial plexus and those without.

There were 45 patients (37.8%) in the first group (those with irritation of the brachial plexus).

The ratio of women to men was significantly higher in patients with irritation of the plexus as was the incidence of symptoms other than neck pain.

There was no significant difference between the two groups with regard to psychological status or findings in radiographs of the cervical spine.

Symptoms and signs attributable to stretching of the brachial plexus do occur in a significant proportion of patients after a whiplash injury.

Their presence and persistence are associated with a poor outcome.

THESE AUTHORS ALSO NOTE:

“The incidence of whiplash injury of the cervical spine has increased dramatically.”

The presumed damage in minor whiplash is a soft-tissue sprain.

40% of whiplash patients have persistent discomfort and 10% are unable to return to work.

"Some patients with a whiplash injury appear to have irritation of the brachial plexus, an unusual autonomic status, peripheral nerve dysfunction and psychological problems."

The authors compared the symptoms, physical signs, autonomic status, psychological status, cervical spine radiographic findings, and outcome between patients with irritation of the brachial plexus and those without.

The authors studied prospectively 119 patients injured in road traffic accidents. There were 60 women and 59 men with mean ages of 35.7 (14 to 27) and 36.1 years (16 to 61), respectively.

"Since the onset of symptoms is sometimes delayed, all patients were included in the study, whether or not they had significant complaints at their initial visit, and all had plain radiographs taken of the cervical spine. For each patient the mechanism of injury, symptoms, signs and autonomic and psychological status were recorded."

"The patients were interviewed again and their symptoms and signs assessed at 1, 2, 4, 8 and 12 weeks after the accident."

The findings for the patients with irritation of the brachial plexus were compared with those who did not have brachial plexus irritation.

Brachial plexus irritation diagnosis was determined by:

- (1) Persistent diffuse pain or paraesthesiae in the upper limb aggravated by carrying, lifting, overhead elevation or repetitive use of the arm.
- (2) A positive Tinel sign over the brachial plexus at the scalene muscles or supraclavicular fossa.
- (3) Reproduction of pain or paraesthesiae by maneuvers stressing the brachial plexus with the shoulder at 90° of abduction in external rotation, or with a traction manoeuvre.

The results of treatment were classified into three groups:

- (1) Excellent, with absence of symptoms or signs.
- (2) Good, with some persistence of symptoms and signs.
- (3) Poor, with significant persistence of symptoms and signs, or no improvement.

Results

45 of the 119 patients, (37.8%), had irritation to the brachial plexus.

"The ratio of women to men was significantly higher in the group with irritation."

"There were no significant differences between the two groups with regard to the age of the patients or the mechanism of injury."

"The mean onset of evidence of irritation of the brachial plexus was 6.7 days (0 to 37) after injury; 39 (90.7%) of the 43 patients reviewed had symptoms and signs within two weeks of injury."

Patients in both groups experienced:

	IRRITATION GROUP	NON-IRRITATION GROUP
Neck pain	98%	99%
Headache	98%	53%
Nausea	69%	20%
Dizziness	53%	16%
Eye Discomfort	58%	23%
Feeling Unwell	67%	20%
Tinnitus	33%	10%
Sleeplessness	78%	37%

The most common symptoms were neck pain, headache and nausea.

The incidence of symptoms, except for neck pain, was significantly higher in patients with irritation of the brachial plexus.

Physical signs included:

Decreased range of movement of the neck.

Paraesthesiae in the upper arm.

Forearm and/or hand weakness.

Coldness, discoloration and hyperhydrosis in the upper limb.

Upper limb swelling.

Positive Tinel sign over the scalene muscles or in the supraclavicular fossa, the cubital tunnel, the radial nerve at the elbow and/ or the carpal tunnel.

Discomfort with the shoulders in 0 of abduction and external rotation or in similar maneuvers causing traction to the brachial plexus.

"The incidence of these signs was significantly higher in patients with irritation of the brachial plexus."

"There were no significant differences in the findings from plain radiographs of the cervical spine between the two groups."

"No fracture or dislocation was seen on radiographs of the cervical spine in either group."

In patients with irritation of the brachial plexus, only one showed a radiological abnormality, a cervical rib.

"Three months after injury, the outcome was significantly worse in patients with irritation of the plexus."

"At six months, 42.2% of brachial plexus injury patients still required treatment."

At six months, only 6.8% of patients without irritation still required treatment.

Patient outcome results at three months after injury

	IRRITATION GROUP	NON-IRRITATION GROUP
EXCELLENT	0.0%	39%
GOOD	47%	36%
POOR	53%	24%

DISCUSSION

A 1991 study reported that a traction injury of the brachial plexus was the commonest significant neurological injury after whiplash.

A 1993 study confirmed operative findings of injury around the brachial plexus in patients with a stretch-type lesion after a whiplash injury.

This "study shows that symptoms and signs attributable to stretching of the brachial plexus does occur after whiplash injury in a significant proportion of patients, and that the presence and the persistence of these symptoms and signs indicate an unfavourable prognosis."

The high prevalence of females in the group of patients with irritation may be due to differences in cervical muscle strength.

40% of patients with irritation had a positive Tinel sign in relation to distal peripheral nerves, suggesting that proximal stretching may render the distal nerve more susceptible to subsequent compression.

[DOUBLE CRUSH SYNDROME]

A significant proportion of patients with irritation of the brachial plexus had abnormal autonomic status, including:

Neck and arm pain or numbness

Headache

Nausea

Sleeplessness

General fatigue

Hyperhidrosis and swelling of the hand

“These patients should undergo thorough neurophysiological investigation although the findings will usually be normal, indicating that conduction studies relate to events in the largest myelinated fibres and not to changes in the behaviour of non-myelinated fibres.” **[IMPORTANT]**

Irritation of the brachial plexus injury is common in whiplash patients.

Patients with irritation of the brachial plexus have a poor outcome.

“For optimum treatment and proper assessment of the symptoms and signs of whiplash injury, clinicians should look for cervical pathology, an unusual autonomic status, peripheral nerve dysfunction and psychological problems, recognizing that irritation of the brachial plexus may be a complication of this type of injury.”

KEY POINTS FROM DAN MURPHY

- (1) Brachial plexus injury occurs often from whiplash. In this study it was found to be 37.8% of patients.
- (2) Delayed onset for brachial plexus symptoms is very common, with a mean of 6.7 days and some being delayed as long as 37 days.
- (3) Brachial plexus injury is not related to patient age (range 16- 69 years) or to mechanism of injury.
- (4) Brachial plexus injury is significantly more likely to occur in women compared to men (nearly twice as common).
- (5) This article gives evidence of support for the Double Crush Syndrome.
- (6) The brachial plexus injury and it's associated symptoms involve the sympathetic portion of the autonomic nervous system. Post-ganglionic sympathetic efferents are non-myelinated, and problems in these non-myelinated sympathetic fibers are not assessed with nerve conduction studies.