

Late Sequelae of Whiplash Injury with Dissection of Cervical Arteries

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FROM ABSTRACT

Background/Aims:

The objective of our study was to estimate the incidence of posttraumatic dissections of cervical arteries in patients with whiplash injury acquired in a car accident.

Methods and Patients:

We performed a retrospective analysis of medical records of 500 patients with whiplash injury acquired in car accidents between 1996 and 2005 and searched for dissections of cervical arteries occurring within 12 months after injury.

Results:

Eight cases of cervical arterial dissection occurred within 12 months following whiplash injury:

Age	Sex	Artery	Time Delay	Collision Type	Speed
21	F	Vertebral	2 wks	Head-on	High
31	M	Carotid	Minutes	Head-on	Low
32	F	Carotid	6.5 mo	Rear-end	?
32	M	Carotid	8 mo	Head-on	Low
38	M	Middle Cerebral (off Carotid)	Minutes	Head-on	High
44	M	Carotid	6 days	Rear-end	Low
45	M	Vertebral	4 mo	Rear-end	?
45	F	Carotid	Hours	Rear-end	Low

The incidence of posttraumatic dissections after whiplash injuries **[1,600/100,000]** was much higher **[about 400 times higher]** than the overall incidence of cervical arterial dissections in the general population **[4.1/100,000]**.

The risk of cerebrovascular events was still increased 4–12 months after whiplash injury (600/100,000 from whiplash v. 3/100,000 in the general population). **[200 times greater from whiplash v. the general population].**

Conclusions:

There is an increased risk of posttraumatic dissection and cerebrovascular events within 12 months after whiplash injury.

Car accidents are an important risk factor for arterial dissections.

The victims of car accidents should be screened for arterial dissections.

KEY POINTS FROM THIS ARTICLE:

- 1) "Cervical arterial dissection is one of the main causes of ischemic stroke in young adults."
- 2) Cervical arterial dissections can be categorized as traumatic or spontaneous.
- 3) Cervical artery dissections "occur when a tear forms in the tunica intima and blood enters into the space between intima and media. This can lead to a complete occlusion of the vessel lumen, which is mostly followed by recanalization after several months."
- 4) "Approximately 2/3 of dissections of cervical arteries are spontaneous and 1/3 of them are posttraumatic."
- 5) The overall annual incidence of spontaneous and posttraumatic dissections of the carotid artery is 26 / 1 million."
- 6) The incidence of vertebral arterial dissection is 15 / 1 million.
- 7) The overall incidence of cervical arterial dissections is 41 / 1 million (26 / million carotid + 15 / million vertebral).
- 8) These authors "retrospectively analyzed the data on 500 consecutive patients with whiplash injury acquired in a car accident, and revealed 8 cases with cervical arterial dissection. The incidence of cervical arterial dissections in patients with whiplash injury was much higher than the overall incidence of cervical arterial dissections in the general population. Therefore, we assume a causal relationship between arterial dissection and cervical spine distortion injury."
- 9) "Cervical arterial dissection can become symptomatic months after a whiplash injury." In this study, 37.5% occurred between 4 -12 months post whiplash injury.
- 10) "Whiplash trauma in a road traffic accident can lead to cervical arterial dissection, which initially is asymptomatic."
- 11) "Most clinicians are not aware that patients with arterial dissections are still at risk of cerebrovascular events months after the dissection."
- 12) "Dissections of cervical arteries following car accidents are often not recognized by clinical examination."

- 13) "Arterial dissections following car accidents can become symptomatic months after whiplash injury."
- 14) "Many dissections of cervical arteries remain clinically asymptomatic, and the association with a car accident is not recognized."
- 15) There is an increased risk of posttraumatic cervical artery dissection within 12 months after whiplash injury (by about 400 times).
- 16) Motor vehicle collisions should be considered as a risk factor for cervical arterial dissections.
- 17) "The clinical implementation of this finding should be that the patients with whiplash injury acquired in a car accident are screened for arterial dissections. In case of clinically suspected cervical arterial dissection, each patient should receive Doppler sonography."
- 18) "Initial MRI of the cervical spine and follow-up investigations after 1–3 months should be considered in patients with whiplash trauma in order to detect vascular, osseous, ligamentous and nerve injuries."
- 19) Car accidents are an important risk factor for arterial dissections.
- 20) The victims of car accidents should be screened for arterial dissections.
- 21) "There is an association between whiplash injury with arterial dissection and delayed cerebrovascular events occurring months after a car accident."
- 22) MECHANISM OF CERVICAL ARTERY DISSECTION AND SUBSEQUENT SYMPTOMS:
- A)) Cervical Artery Dissection forms an intraluminal blood clot that occludes the vessel. This occlusion cannot be washed out by the blood stream.
- B)) "The occlusion of the vertebral artery is compensated by a collateral blood supply through the contralateral vertebral artery and does not become symptomatic."
- C)) The occlusion of the carotid artery can be compensated through the collaterals of the Circle of Willis.
- D)) Therefore, if arterial dissection does not cause a hemodynamic infarction and is adequately compensated for, "it remains asymptomatic."
- E)) Recanalization of the occluded vessel can occur weeks and even months (max. 24 months) after the initial arterial dissection.

F)) The recanalization can wash out the intraluminal blood clot, causing a downstream embolism. This embolism is the probable mechanism responsible for delayed cerebrovascular events following whiplash injury. "Generally, secondary thromboembolism can occur within 12 months following whiplash trauma."

IN THIS STUDY:

23) Head-on collision and rear-end collisions were equally likely to produce a cervical artery dissection.

24) Low speed collisions were just as likely as higher speed collisions to create a post-traumatic cervical artery dissection.

25) 25% of the whiplash artery dissections were the vertebral artery, while 75% were from the carotid or its branches.