Addendum

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CVA
ADDENDUM

AD HOC COMMITTEE FOR
CERVICAL ADJUSTMENT AND CEREBROVASCULAR
ACCIDENT RISK ASSESSMENT AND CLINICAL PROTOCOLS

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Introduction

It is important to note that our recommendations distinguish between the different types of CVA and their associated risk factors. Specifically, distinctions must be made between a patient who is at risk for CVA of the cerebral anterior circulation or CVA due to non-manipulative risk factors and a patient who is at risk for vertebral artery dissection (VAD) and/or internal carotid artery dissection (ICAD), or other specific injury to the vertebral artery secondary to spinal adjustment. The current literature draws no correlation between cervical adjustments and intracranial CVA or CVA due to arteriosclerosis. Our findings are based on vertebral and/or internal carotid artery injury only.

The Associate of Chiropractic Colleges (ACC) released the following statement regarding provocative testing which was passed by unanimous vote at the 2004 ACC/RAC Conference and forwarded to ACC Presidents and Chief Academic Officers:

The current evidence base indicates lack of validity and predictive value of pre-manipulative testing of vertebral artery function, as commonly taught and practiced in the chiropractic profession. Therefore, the use of pre-manipulative testing of vertebral artery function to identify contraindication to cervical manipulation/adjustment should neither be taught nor practiced in chiropractic programs/institutions curricula nor promulgated as "standard of care."

It is important to note that this statement reflects current research on provocative positions only. Previous studies have indicated that vertebral arteries may vary in strength and susceptibility to failure under stress. The susceptibility of these arteries has been hypothesized to be secondary to different pathophysiologies including abnormalities in alpha1-antitrypsin, homocysteine levels, genetics or other connective tissue disorders. These hypotheses have not been demonstrated in large trials and therefore, at this time there can be no definitive recommendations made in regards to specific predisposing factors. However, it was the intent of this committee to examine all possibilities with respect to screening procedures in order to ensure the highest standard of education for our students and the utmost safety for our patients.

Age and Gender as Risk Factors for Cervical Manipulation

- There does not appear to be a correlation between a patient’s age and his/her risk of vertebral artery insult or vertebrobasilar stroke as result of cervical manipulation. The wide age variation in reported cases suggests that age is not a good predictor of risk for vertebral artery injury with cervical manipulation.

- There is an apparent increase in reported cases of vertebrobasilar accidents in young adults, particularly in the 30 - 45 year age group. However, there is no statistical significance to this increase as this can easily be attributed to the documented increase in patients from this age group who seek chiropractic services.
• The presence or absence of degenerative osseous or vascular changes as a consequence of advancing age does not appear to be significant in assessing a patient’s risk for vertebral artery insult or vertebrobasilar stroke following cervical manipulation.

• There does not appear to be a correlation between gender and a patient’s risk of sustaining a vertebral artery injury or vertebrobasilar stroke associated with cervical manipulation.

• While some of the literature has stated that females are more at risk than males for suffering a vertebrobasilar injury as a consequence of cervical manipulation, current literature and hard statistical analysis does not confirm this.

• Raw data at first appears to suggest a greater risk for females but when adjusted for other factors the data does not indicate a predilection for this kind of injury among women. The apparent increase in female incidents is a reflection of the greater number of female patients that are seen in chiropractic offices.

**History and Chief Complaint in Assessing Vascular Risk in Cervical Adjusting**

• It is incumbent upon examiners to evaluate for stroke risks (of any etiology) and make appropriate referrals when warranted- risk factors are well established for some types of stroke.

• History is important. Since stroke can affect any age group symptoms such as headache and neck pain, particularly for arterial dissection, is important.

• Delayed responses to vascular injuries include headaches and sinus pain.

• In one study that addressed pediatric cases, internal carotid artery and vertebral artery dissection were preceded by physical effort.

• **Women of childbearing age with migraine appear to be at a higher risk of ischemic stroke than non-migrainers.” “…established risk factors including hypertension, smoking, and oral contraception.”**

• Dementia and cognitive decline can be indicators of stroke
Bilateral Blood Pressures and Fundoscopic Examination

Systemic hypertension may have renovascular, hepatic, cardiovascular or other etiologies and is a significant finding in physical examination as a possible predictor of stroke, but the literature does not support systemic hypertension as a predisposing factor for carotid or vertebral artery dissection or post-adjustment injury. There is empirical evidence to suggest that unilateral hypertension or blood pressure asymmetries may be associated with ipsilateral cerebellar hemisphere damage secondary to vascular insult or subclavian steal syndrome. The research also discusses cases of systemic hypertension as a result of infarct of the medulla near the tractis solitarius, where the probable mechanism is sympathetic escape due to loss of normal parasympathetic activity. Unilateral or systemic hypertension found concomitantly with other red flags and warning signs for vascular insult should be considered as ominous and addressed accordingly. Only one article of those reviewed mentioned hypertension as a risk factor for VAD, but did not indicate the duration or severity of the hypertension in regard to the possible increased risk (Lang). Thus, at this time, sustained high blood pressure cannot be considered a reliable or specific screen for risk of VAD.

Fundoscopic evaluation for vascular changes can be diagnostic for chronic or poorly managed hypertension. As noted above, hypertension is a risk factor for stroke, but not a reliable risk factor for dissection or post-adjustment injury. The presence of Hollenhorst plaques suggest disease through the anterior circulation and, again, are warning signs for general stroke only and not suggestive of predisposition to arterial dissection. The presence of Hollenhorst plaques, atheromatous emboli in the retinal arterioles that contain cholesterol crystals and originate in the carotid artery or great vessels, brings atherosclerosis into diagnostic picture. Correlation with other symptoms such as amaurosis fugax or other pathology should be made, however, this condition is not correlated with vascular injury associated with cervical adjustment. The condition of the fundus should be correlated with other physical and neurological examination findings.

Head/neck Auscultation and Cranial Nerve/Cerebellar Examination

Bruit heard during auscultation of the head and neck may be incidental findings, and do not imply arterial compromise. Studies that used angiography to determine the correlation between bruits and carotid lesions reported that auscultation had very low reliability. In these cases significant bruits were auscultated in patients with no demonstrable carotid changes and bruits were often absent in stenotic lesions. The literature supports the conclusion that the presence of a bruit does not necessarily indicate a stenotic condition of the artery auscultated and, perhaps more significantly, the absence of a bruit does not necessarily indicate healthy structure of the arteries auscultated. Additionally, it has been noted that bruits in healthy arteries can be caused by pressure from the bell of the stethoscope during examination.

True dissection of the cerebellar arteries is rare, but when present produces frank cerebellar symptomatology. Other reliable factors as indicators of early onset dissection include facial paresthesias, diplopia, ataxia, dysarthria, dysphagia and vertigo, in addition to sudden headache, and neck stiffness. As such, it is recommended that cerebellar and cranial nerve examinations be included in the screening procedure.
If cerebella or cranial nerve symptomatology is present, doctors should abstain from cervical adjusting until the cause can be determined, but it is important to note that positive cerebella or cranial nerve findings are not exclusive to vertebral artery comprise and may be the result of other pathology.

**Cervical Functional Vascular Testing**

Cervical Functional Vascular Tests (FVTs, aka provocation tests) were first referenced in the literature by Maitland (1968) in an attempt to identify patients who were at risk for cerebrovascular accidents associated with spinal manipulative therapy (CVA-SMT). In theory these tests assess the patency of the vessels (the vertebral artery (VA) and internal carotid artery (ICA)) on one side of the neck by attempting to mechanically occlude the other side during cervical rotation/extension. The tests were designed based on the assumption that the underlying mechanism of CVA-SMT involved a reduction in the blood supply to the brainstem due to simple compression of the vessels in susceptible individuals, or that possibly arteriosclerosis existed and an embolus might be created by SMT. In this latter scenario arteriosclerosis may have created serious vascular occlusion and it was hypothesized this could be discovered using FVTs.

Given the research findings over the last three decades, these earlier proposed mechanisms now have little support. To begin, it is now well established that in the majority of SMT-CVA cases the mechanism involved is a tearing (dissection) of the artery(s) in the cervical region, usually the VA (Terrett, 2002; Terrett, 2001; Haldeman, 1999) at the C1-C2 area (Haldeman, 2002; Terrett, 2000; Hufnagel, 1999). This may subsequently cause ischemic stroke due to arterial blockage by a thrombus or embolus. A second mechanism known as “vasospasm” is also suspected in some cases, and in this situation temporary stasis of blood flow is also thought to result in thrombus formation with potential embolus. Because FVTs attempt to assess the patency of the vessels and do not address the underlying mechanisms involved with dissections or vasospasms, it must be concluded they lack validity, ie they do not detect those patients who are at risk for an SMT-CVA event (Bolton, 1989).

In fact many false-negative type experiments have been performed using Doppler ultrasound whereby complete occlusion of the VA was recorded yet no signs or symptoms occurred because of adequate collateral circulation (Licht 1998; Rivett, 1998; Haynes, 1996; Refshauge, 1996). Similarly, in two published accounts no symptoms were produced during FVTs, yet the two patients did subsequently have a post-SMT stroke (Lindy, 1984; Parkin, 1978). Therefore it can be concluded that FVTs are prone to false negative findings; this unfortunately may create a false feeling of security within the practitioner and may add an additional danger to the patient.

False-positive findings during FVTs are also problematic in that usually the most frequent sign present with these tests (dizziness) is not due to vascular occlusion or any underlying vascular pathology. Instead it appears dizziness is more commonly due to proprioceptive aberrations (from the cervical joints or muscles), cervical sympathetic stimulation, vestibular disease or hyperventilation (Terrett, 2001). Many cases have been published whereby the patient’s dizziness disappeared after SMT and further testing was unable to reproduce any symptoms (Cote, 1991; Fitz-Ritson, 1991).
It is therefore concluded that FVTs can produce a significant number of false-positive findings (albeit findings that are important to note and determine the cause of) that could lead the practitioner astray.

Finally, because these tests actually induce a mechanical strain on the arterial structures, they are potentially damaging in and of themselves, especially to a patient who has a serious pre-existing vascular weakness like a dissection in progress (Terrett, 1990; Jaskoviak, 1980). In the interests of patient safety it is concluded that FVTs are not appropriate, especially for the population of patients we are most concerned about ie, those with vascular fragility/injury.

In conclusion, recently many chiropractic authorities have questioned the utility and safety of FVTs and have therefore recommended discontinuing their use. This includes Anthony Rosner, PhD (2003) (director of FCER), Allan Terrett, DC (2001) (paid consultant to NCMIC and author of their primary text on this topic), the ACC Technique Consortium (2004, personal communication) and the ACC Clinic Directors group (2004, personal communication).

**Conclusions**

Age and gender, bilateral blood pressure and pulse pressures, head and neck auscultation, and provocative position tests are not sensitive or specific for predicting dissection of the vertebral or internal carotid arteries caused by cervical adjustment. Family and personal history are not predictable factors for dissection injuries, with the exception of a chief complaint or personal history that includes red flags stated below, which would increase the suspicion of a dissection in progress. It is important to note that positive findings and/or significant history attributable to stroke are to be appropriately considered as it is the responsibility of the chiropractor to be aware of the warning signs and symptoms of cerebrovascular accident regardless of etiology.

Chief complaint red flags include:

1. Neck pain
2. Headache (most commonly occipital)
3. Vertigo
4. Unilateral facial paresthesia
5. Nausea/vomiting
6. Unsteadiness/ataxia
7. Diplopia
8. Dysarthria
9. Dysphagia
10. Limb numbness and weakness

The literature supports the contention that the actual symptoms of vascular accident may not appear for up to two weeks following initial dissection. It is therefore recommended that those patients who present with new onset or sudden onset of headache and upper cervical spine pain with any of the associated red flag symptoms be treated cautiously and conservatively for two weeks avoiding cervical adjusting for that period.
Though the literature does not review cerebellar and cranial nerve examinations as predictive factors in arterial dissection, the red flags symptoms suggest that positive findings in the cerebellar and cranial nerve examinations could suggest early cerebral posterior circulation compromise. As such, it is recommended that cerebellar and cranial nerve examinations should be included in the screening procedure.

The appropriate advanced testing strategy is non-contrast MRA, however, if hemorrhage is suspected, MRI with a follow-up CT is recommended.

As it appears that arterial dissection secondary to cervical adjustment is extremely rare, yet virtually unpredictable, the members of this committee consider the use of informed consent to be a moral and ethical obligation. The literature supports this opinion and we believe that informed consent will become standard of care. We acknowledge that the NYCC Health Centers utilize informed consent and we recommend that this is taught in the core curriculum as part of standard office procedure. The use of written informed consent should include risk factors and as well as treatment options.


References Consulted


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