MASSAGE THERAPY AND VERTEBRAL ARTERY DISSECTION: A REVIEW OF RECENT CASE REPORTS

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ABSTRACT

Case reports are often published on cervical artery dissection (CAD) with one subgroup of these being vertebral artery dissection (VAD). VAD following neck massage has been reported in literature but not summarized. Head and neck massage is sometimes delivered by inadequate or un-trained people (eg barbers/salon people). These un-trained lay people appear to also deliver spinal manipulative therapy (SMT).

Chiropractic care often includes SMT, massage, soft tissue therapy, and other forms of therapy. However, other professions, including physiotherapy (physical therapy), osteopathy, and medical practitioners, also deliver SMT. In addition, many other "therapists" deliver SMT, with and without massage therapy. Sometimes these "therapists" do not necessarily have any formal training or qualifications. Qualified professionals such as physiotherapists (physical therapists), osteopaths, and massage therapists also deliver massage therapy. Some case reports incorrectly use the term "Chiropractic" or "Chiropractic technique" when describing a manual therapy such as massage. Clearly, massage therapy and SMT are not exclusively delivered by one profession (namely chiropractic).

This paper is a review of recent case reports on VAD following massage and will also discuss why the term "Chiropractic" was incorrectly used. In addition, this paper discusses some evidence assessing chiropractic as a trigger for CAD. Many case reports regarding CAD continue to be lacking in detail and make significant methodological errors.

KEYWORDS: Spinal manipulative therapy; vertebral artery dissection; cervical artery dissection; massage therapy; chiropractic;

INTRODUCTION

It is estimated that the annual incidence of cervical artery dissection (CAD) is approx. 3.6 per 100,000 population.(Lee, Brown et al. 2006, Béjot, Aboa-Eboulé et al. 2014) CAD is also denoted as CeAD, and can be either internal carotid artery dissection (ICAD) which is estimated at 2.6 per 100,000 population or vertebral artery dissection (VAD) estimated at 1 per 100,000 population.(Ortiz and Ruland 2015)

Most cases of CAD are described as spontaneous with no obvious cause.(Schievink and Debette 2011) CAD may occur following activities such as sports (golf, tennis, swimming, scuba, gym, karate); hobbies including dancing and water slide riding; activities of daily living including painting a ceiling, hair dresser visits, seeing a dentist; and minor trauma such as a low speed MVA.(Slowey, Maw et al. 2012, Mohaghegh and Hajian 2015, Kageyama, Yoshimura et al. 2016, Mas Rodriguez, Berrios et al. 2016, Alboudi, Sarathchandran et al. 2018, Aljishi and Jayathissa 2018, Suzuki, Tsuchimochi et al. 2018, Saw, McIntosh et al. 2019, Engelter, Traenka et al. 2021, Kacprzynski and Bucher 2021)

Many case reports omit details on events prior to the onset of first symptoms of VAD (which is often neck pain or headache).(Tuchin and Perle 2016)

In addition, some cases of VAD have been reported after massage therapy or other manual procedures prior to the onset of the VAD.(Elkady, Ghazal et al. 2020, Covello and Chukus 2021) Whilst VAD is a rare event, it is an important cause of stroke in young people.(Putaala, Metso et al. 2009) Sometimes the term "chiropractic" is incorrectly used when a manual therapy (such as massage) was given to a patient, without any form of spinal manipulative therapy (SMT).(Tuchin and Perle 2016)

Despite the rarity of CAD, case reports of CAD purportedly due to SMT are often published.(Ernst 2007) Unfortunately, some case reports of CAD following SMT are incorrect by using the term "chiropractor" when the person giving the SMT was unlikely to be a qualified chiropractor.(Almuaigel, Althwanay et al. 2020) This may include laymen, massage therapists, physiotherapists or orthopaedic specialists.(Hufnagel, Hammers et al. 1999, Melikyan, Kamran et al. 2015, Yap, Feng et al. 2021)

VAD has been highlighted as a risk of chiropractic SMT, due to a theory based on damage to the vertebral artery occurring around the 2nd cervical vertebrae (denoted the V3 segment of the vertebral artery). However, studies on vertebral artery strain have reported that the forces involved with SMT and not enough to produce a VAD.(Herzog, Leonard et al. 2012, Symons, Wuest et al. 2012) In addition, case reports of internal carotid artery dissection (ICAD) following SMT have been published, although a mechanism for ICAD damage by SMT is controversial.(Chung, Côté et al. 2015) Several studies (discussed later) report minimal risk of CAD after chiropractic SMT.(Cassidy, Boyle et al. 2008, Church, Sieg et al. 2016)

Many case reports of SMT and CAD also have significant omissions, errors and flaws, which impact any appropriate discussion for SMT.(Tuchin 2012, Wynd, Westaway et al. 2013) Case report numbers may also be exaggerated due to a perception that SMT increases the possibility of CAD.(Ernst 2010) There is also a perception that chiropractors may be poor at diagnosing CAD or potential contra-indications for SMT.(Turner, Lucke-Wold et al. 2018)
This paper reviews recent case reports (2014-2023) on CAD and massage therapy in detail and discusses the evidence assessing chiropractic as a trigger for CAD.

METHODS

A search of the PubMed database was conducted for recent case reports (2014-2023) using the keywords: "massage," "cervical artery dissection", "vertebral artery dissection", "carotid artery dissection" and "case report". From the initial search, the reference sections of retrieved papers were also reviewed for any potential missed cases, to ensure the inclusion of all recent cases of cervical artery dissection. The initial search yielded approximately fifteen hundred manuscripts from which seven meet all inclusion criteria. An additional two articles are also included from the reference checking, which are on topic but outside inclusion criteria.

RESULTS

massage	("massage"[MeSH Terms] OR "massage"[All Fields] OR "massages"[All Fields] OR "massaged"[All Fields] OR "massager"[All Fields] OR "massagers"[All Fields] OR "massaging"[All Fields]) AND (y_10[Filter])	7,076
vertebral artery dissection	("vertebral artery dissection"[MeSH Terms] OR ("vertebral"[All Fields] AND "artery"[All Fields] AND "dissection"[All Fields]) OR "vertebral artery dissection"[All Fields]) AND (y_10[Filter])	1,459
((vertebral artery dissection) AND (massage)) AND (case report)	(("vertebral artery dissection"[MeSH Terms] OR ("vertebral"[All Fields] AND "artery"[All Fields] AND "dissection"[All Fields]) OR "vertebral artery dissection"[All Fields]) AND ("massage"[MeSH Terms] OR "massage"[All Fields] OR "massages"[All Fields] OR "massaged"[All Fields] OR "massager"[All Fields] OR "massagers"[All Fields] OR "massaging"[All Fields]) AND ("case reports"[Publication Type] OR "case report"[All Fields])) AND (y_10[Filter])	7

A detailed description of the case reports follows.

CASE REPORT #1

A 2021 case report by Yap et al. describes a case of CAD in a 35 year old male who presented to a hospital in China after a “chiropractor massage”.(Yap, Feng et al. 2021) In this case, the dissection was in an internal carotid artery, but also included bilateral vertebral artery intimal oedema. This case report unfortunately follows a common trend of attribution of CAD with chiropractic care (which is discussed later).(Tuchin 2012, Wynd, Westaway et al. 2013, Bronson, Perle et al. 2017, Tuchin 2019, Pollard 2021) This trend infers chiropractic SMT caused a CAD because it took place at some time before the CAD became apparent. This is referred to as protopathic bias and is also discussed later in this paper. In addition, it should be noted that there are no chiropractic programs in educational institutions in China. Therefore, highly unlikely the massage was delivered by a person with a chiropractic qualification (as noted by Pollard). (Pollard 2021)

A 35-year-old Chinese man with no risk factors for stroke presented with a 2-day history of expressive dysphasia and a 1-day history of right-sided weakness. The presentation was preceded by multiple sessions of neck, shoulder girdle and upper back massage for pain relief in the prior 2 weeks. CT of the brain demonstrated an acute left middle cerebral artery infarct and left internal carotid artery dissection. MRI cerebral angiogram confirmed left carotid arterial dissection and intimal oedema of bilateral vertebral arteries. In the absence of other vascular comorbidities and risk factors, massage-induced internal carotid arterial dissection will most likely precipitate the near-fatal cerebrovascular event. The differential diagnosis of stroke in a younger population was consequently reviewed and discussed.

The clinical history is lacking in key areas. For example, what (if anything) had triggered/caused the onset of the first episode of upper back, shoulder and neck pain? This is critical in determining if this is yet another case of spontaneous VAD, or an example of a minor activity being the final event before the artery finally dissected.(do Nascimento, da Cruz et al. 2021, Ewida, Ahmed et al. 2021) As noted earlier, many case reports describe minor activities prior to the onset of the VAD.(Slowey, Maw et al. 2012, Mohaghegh and Hajian 2015, Kageyama, Yoshimura et al. 2016, Mas Rodriguez, Berrios et al. 2016, Alboudi, Sarathchandran et al. 2018, Aljishi and Jayathissa 2018, Suzuki,

Tsuchimochi et al. 2018, Saw, McIntosh et al. 2019, Engelter, Traenka et al. 2021, Kacprzynski and Bucher 2021) A quick literature search by the authors would have been sufficient to identify how frequently such events precede a VAD.(Elkady, Ghazal et al. 2020)

Much of the clinical history needed for a clear diagnosis is not reported. The inclusion of the important clinical history factors would clarify the relationship of the massage with the CAD adverse event. For example, when did the symptoms on presentation for massage commence? Did the patient have any other symptoms or signs of CAD (eg sensations such as numbness, dizziness, diplopia, dysarthria, a new headache, etc) Did anything appear to trigger these symptoms (eg sports, activities, etc)? What did the massage treatment entail? Did the pain change after the massage? Questions regarding the temporal nature of symptoms are critical in determining any relationship of adverse events to the treatment.

In addition, what risk factors (smoking, obesity, hypertension, hyperlipidaemia, migraine, recent fever, etc) for VAD or stroke were present at the first massage or recent massages.(Ortiz and Ruland 2015) As the person reported pain, had they used any anti-inflammatory medications such as Ibuprofen? If yes, how long was it used and at what dosage. Ibuprofen is a well reported risk factor for stroke.(McGettigan and Henry 2011, Chuang, Yu et al. 2015) Unfortunately, these key issues were not discussed in this case report.(Caughey, Roughead et al. 2011, Park and Bavry 2014)

CASE REPORT #2

Gomez-Rojas et al reported on a 37-year-old female who had a two week history of neck pain and headaches.(Gomez-Rojas, Hafeez et al. 2020) The patient reported using acetaminophen and heat pads, but the pain increased. The patient then tried yoga, block therapy, and massage but the pain became even more severe, bilateral, with severe dizziness and nausea.

37-year-old Caucasian female with a history of dyslipidemia, asthma, and fibroids presented to the emergency room reporting two weeks of bilateral posterior neck pain and headaches. She initially presented with right-sided neck pain, which she attributed to various physical activities and sleeping in uncomfortable hotel beds. Of note, she described multiple recent visits to a theme park and enjoyed numerous roller coaster rides. The pain was achy, constant in nature, extending to the back of the eyes, and rated as 4 on a 10- point scale. Her pain persisted and increased in severity despite acetaminophen use and application of heating pads. She then tried block therapy, yoga, and deep tissue neck massage. The pain then became bilateral, even more severe, followed by an episode of severe dizziness and nausea which prompted the emergency room visit. Her family history was negative for connective tissue diseases. The patient was taking oral contraceptive pills and had discontinued statin therapy a few years ago. She denied using tobacco products, illicit drugs, or excessive alcohol

As can be noted by the clinical history, a temporal relationship between the onset of symptoms and any correlation to a specific treatment (including massage) is very unclear.

Of note, the patient reported many roller coaster rides prior to the onset of the neck pain and headache. Other studies have reported cases of VAD after roller-coaster rides.(Schneck, Simionescu et al. 2008, Ozkan Arat, Volpi et al. 2011, Sa Leitao, Mendonca et al. 2012) In addition, the patient had several significant risk factors including dyslipidemia, oral contraceptive pill (OCP) use and fibroids.(Yang, Peng et al. 2020)

This case report is another example of poor writing and poor science. As discussed previously, there were significant risk factors present which were not highlighted, which may have been more important than the massage treatment. Larger and better quality studies have reported minor trauma, dyslipidemia, and the OCP as significant risk factors for VAD.(Rubinstein, Peerdeman et al. 2005, Dittrich, Rohsbach et al. 2007, Debette and Leys 2009, Schievink and Debette 2011, Engelter, Grond-Ginsbach et al. 2013, Béjot, Aboa-Eboulé et al. 2014, Yang, Peng et al. 2020)

CASE REPORT #3

Chen et al reported on a 48-year-old man with hypertension who had dizziness accompanied by neck pain after a recent massage.(Chen, Qiao et al. 2019) When the patient was brought to the emergency room of a hospital, his vital signs were within normal limits, except for hypertension, which was reported as (150/120 mm Hg, 1 mm Hg = 0.133 kpa). After antihypertensive therapy was provided, the man's symptoms were subsequently relieved. The patient was discharged home, but he felt dizzy again after 3 hours. Progressive numbness and dyspnea occurred when the man reached the hospital again, which led to sudden cardiac arrest. Brain computed tomography (CT) revealed no abnormal findings. He was admitted to hospital for further treatment on the same day.

This is a slightly abridged version of the only clinical details noted in the case report. As similarly discussed in the previous case report, no information on presenting symptoms before massage, or a temporal description of events was recorded in the case report. In addition, a very limited report was provided on stroke risk factors present in this case.

Of note, the authors used "Chiropractic" as key word, when clearly only massage therapy was applied to this person. Why did the authors choose "Chiropractic" as key word and not "Massage", "Physiotherapy" or "Osteopathy" as key words? One could also argue that the hypertension treatment the person received, prior to being sent home, had caused the VAD. Brain computed tomography (CT) at the time of initial presentation to the hospital revealed no abnormal findings, therefore the VAD occurred after the hypertension treatment. Perhaps this case report should be titled "*Vertebral Artery Dissection Probably Caused by Hypertension Treatment: A Case Report".* Another alternative title could be "*Vertebral Artery Dissection Probably Caused by visiting a Hospital: A Case Report".*

In addition, as discussed earlier, there are no chiropractic programs in educational institutions in China. Therefore, highly unlikely the massage was delivered by a person with a chiropractic qualification.

CASE REPORT #4

Dutta presented a case of VAD in a 30-year-old male patient following a neck massage.(Dutta, Jagetia et al. 2018) The person developed headache, nausea, vomiting, blurred vision, diplopia, dizziness, and ataxia following the massage. A VAD of the V3 segment of the left vertebral artery with narrowing of the V4 segment consistent with dissection, along with a cavernous segment aneurysm of the contralateral internal carotid artery, was later identified by imaging.

BACKGROUND: Vertebral artery dissection (VAD) is an important cause of stroke in young and a known complication of spinal manipulation procedures, although dissection following neck massage has rarely been reported in literature. Head and neck massage by improperly trained salon employees is very popular and widely practiced in developing countries like India. In the present report we present a case of VAD following neck massage. MATERIAL AND METHODS: We present an unusual case of VAD in a 30-year-old male patient following an episode of neck massage. He developed headache, nausea, vomiting, blurred vision, diplopia, dizziness, and ataxia following the procedure. Initial history and examination suggested that the patient's symptoms were vascular in origin. We also discuss a brief review of the pathology, diagnosis, symptomatology, treatment, prognosis, and occurrence of this rare entity.

This case report uses the term SMT when is appears clear that the person received massage only. The case report also notes that massage is often given by “barbers” who have limited (if any) training. Using the term SMT could confuse readers and led to a false conclusion that this is another case of SMT and VAD (especially as the title states “crick in the neck”).

The previously noted discussion points, also apply in this case. There are no chiropractic programs in educational institutions in India. Therefore, highly unlikely the massage was delivered by a person with any qualification, including a chiropractic qualification.

CASE REPORT #5

A case report by Kaur et al. describes a 45-year-old man with sudden onset aphasia and weakness of both lower limbs with bowel–bladder incontinence. The authors reported there was no history of loss of consciousness, headache, nausea or vomiting and convulsions. They also reported the patient had no significant medical history and no vascular risk factors.

The key clinical information is contained in two sentences-

There is history of frequent neck massages from a chiropractor for relaxation purposes with visits amounting to two to four per week. There is no history of neck pain or any transient neurological deficit signs. On admission, he was mute and abulic with receptive aphasia and bilateral lower limb weakness.

Massage two to four times per week, by a chiropractor, for "relaxation purposes", does not sound like a typical chiropractic/patient encounter. The authors stated *"Cervical spine manipulation in the form of neck massage or trivial neck trauma is a known potential mechanical trigger for cervical artery dissection."* This infers the authors interchange the terms massage and cervical spine manipulation. Therefore, this case also appears to be only related to massage and not SMT.

As discussed previously, key clinical information on symptomology and a time-line was also not described in this case report. In addition, the previously noted discussion points apply in this case. There are no chiropractic programs in educational institutions in India, and therefore, highly unlikely the massage was delivered by a person with any qualification, especially a chiropractic qualification.

CASE REPORT #6

Melikyan et al describe a case of cortex-sparing infarction in triple cervical artery dissection following chiropractic neck manipulation, in the Qatar Medical Journal.(Melikyan, Kamran et al. 2015) Whilst this case report, appears to describe chiropractic SMT, on reading the article it is clear the "SMT" was given by a barber in Qatar. Whether the person received SMT or massage is unclear as the article explains how common it is to receive massage and SMT from barbers in Qatar. *"Cervical manipulation is still widely practiced in massage parlors and barbers in the Middle East".*

In addition, the article describes significant risk factors for VAD- "*A 55-year-old man, smoker, with history of diabetes mellitus, hypertension and dyslipidemia, presented to the emergency department"*. However, there is very little information regarding the severity of each of these risk factors. Further, there was a seven-day gap between the last "manipulation" session and the onset of symptoms. The man presented to the ED with acute onset neck pain, hemiparesis, and dysphasia. There was no discussion about any events which triggered the acute onset. As also previously discussed, there are no chiropractic educational institutions in Qatar. Therefore, highly unlikely the person received chiropractic treatment from a licenced/registered chiropractor.(Tuchin and Perle 2016)

CASE REPORT #7

Birkett et al., reported a case of a 39 yo male who presented to the ED after a 24hr history of headache, nausea and vomiting.(Birkett, Pouryahya et al. 2020) The person had a history of migraine, but this episode was atypical of his migraines. The person had received a massage 48 hrs prior to the HA onset, which triggered neck pain. The person had received regular Thai massages, was an ex-smoker, but had few neurological symptoms or signs.

This was a short case report, which also suffered many issues previously described, such as lack of clinical information, especially with regard to triggers for presenting to the

masseuse (eg sport, activities, hobbies, etc.) which may have strained the vertebral artery prior to the massage commencement.

OTHER CASES OF NOTE

Chakrapani et al presented a case report of a 50-year-old woman that was reported to receive a facial massage by a massage therapist, during which the therapist rotated the woman's head to the left, placed her shin on the woman's shoulder and applied posterior-to-anterior pressure against the woman's forehead. The same manoeuvre was repeated on the right side. The woman subsequently experienced bilateral neck pain and headache for days. Thirteen days later, the woman developed sharp pain in the left side of her neck that extended behind the left eye.

This case report appears to describe some form of SMT that was delivered by a massage therapist. It does not describe a procedure commonly used by chiropractors. It is highly unlikely the massage therapist had training in SMT, and some readers could confuse this as a case of chiropractic and VAD. In fact, a subsequent LTE subsequently describes "a chiropractic manoeuvre" as the likely cause of the VAD. (RuDusky 2009)
In addition, there was a 13-day gap after the treatment and the onset of stroke symptoms. There is no discussion in the case report about events in between the treatment and presentation to the hospital. Many other events could have occurred in this 13-day gap, which could be more significant that the manual therapy.

Owada presented 2 case reports in a conference poster. The only details available are below:
Case 1 - 38-year-oldfemale. This patient occasionally visited a Japanese folk osteopathist, when she felt shoulder stiffness lasting for approximately 1 h. Case 2 - A 43-year-old female. This patient had a history of severe headaches and/or shoulder pain since her 30's. When the NSAIDs were not effective, she visited a manipulative massage salon. She consulted our clinic, as she felt severe neck pain after the massage at the salon

As can be noted by the very limited case details, very little is known about the temporal relationship for onset of first stroke symptoms, the history prior to the osteopathy session, what occurred in the session, and VAD risk factors in each patient. These are critical factors for determining what may have been the most significant factor for the VAD in each patient. Case reports like these serve no purpose other than maintaining some clinical awareness of VAD.

TABLE 1 – Type of therapy delivered

Author	Year	Age	Sex	Therapy	Other factors	Country	Licencing
Yap (Yap, Feng et al. 2021)	2021	35	M	"Chiro massage"	Multiple sessions	China	NIL
Gomez (Gomez-Rojas, Hafeez et al. 2020)	2020	37	F	Yoga, massage	2wks after therapy	Peru	NIL
Birkett (Birkett, Pouryahya et al. 2020)	2020	39	M	Massage	no SMT	New Zealand	YES
Chen (Chen, Qiao et al. 2019)	2019	48	M	Massage	Chiropractic as key word	China	NIL
Dutta (Dutta, Jagetia et al. 2018)	2018	30	M	Massage	"Chiro"	India	NIL
Kaur (Kaur, Jain et al. 2012)	2017	45	M	Frequent massage (2-4/wk)	no SMT	India	NIL
Melikyan (Melikyan, Kamran et al. 2015)	2016	55	M	SMT	Given by barber	Qatar	NIL

DISCUSSION

These eight case reports have significant omissions, weaknesses, and overall poor levels of scientific methods. Apart from the very limited clinical information, they all suffer from protopathic bias.

Protopathic bias arises when the initiation of a drug (exposure) occurs in response to a symptom of the (at this point undiagnosed) disease under study (outcome). For example, use of analgesics in response to pain caused by an undiagnosed tumour might lead to the erroneous conclusion that the analgesic caused the tumour. Protopathic bias thus reflects a reversal of cause and effect.(Gerhard 2008)

The authors discuss “massage” as a possible cause of the CAD due to this protopathic bias and without due regard to other more significant factors in their case reports. The authors appeared biased towards massage or manual therapy as a trigger for CAD and did not explore or discuss other trigger factors (eg roller coaster riding, medication use, overseas travel, etc).

In addition, four authors noted “chiropractic” as a probable cause of the CAD in a vacuum of appropriate discussion for the other probable causes of the CAD in their case reports.(Tuchin 2013) This also appears to be due to a protopathic bias from the authors and their failure to correctly assess other potential causes. (See table 2– Other potential causes)

Author	First symptom	Location	Risk Factors	Timeline	Comments
Yap	neck pain, headache	ICA + B/L VAD oedema	NR	NP for 2wks prior	Recent travel, regular massage
Gomez	neck pain, headache	B/L V3, V4	OCP, acetaminophen, dyslipidemia, fibroids	2wks after therapy	Roller coaster, recent travel, block therapy, yoga
Birkett	NR	NR	migraine, ex-smoker	NR	24hrs after
Chen	NR	V2	hypertension	NR	Antihypertensive therapy for dizziness and discharged
Dutta	NR	V3, V4, ICAD	NR	NR	"crick in neck"
Kaur	"relaxation"	B/L ACA	NR	NR	"chiro massage"
Melikyan	CNP	B/L ICA + VAD	Smoking, diabetes, hypertension, dyslipidemia,	1wk	Given by barber

Key: NR = not reported; ICA = internal carotid artery; VAD = vertebral artery dissection; B/L = bilateral; V2 = vertebral artery C2-C5 level; V3 = vertebral artery C1/2 level; V4 = intracranial vertebral artery; ACA = anterior cerebral artery

Past studies on CAD and chiropractic SMT have reported minimal risk. A 2008 study found a cohort of 818 VAD strokes from a sample of more than 100 million person-years. Persons aged >45 years, were about three times more likely to see a chiropractor or a primary care physician (PCP) before their stroke than controls. (Cassidy, Boyle et al.

2008) The authors reported no increased association between chiropractic visits and VAD stroke in those older than 45 years. Positive associations were found between PCP visits and VAD stroke in all age groups. Practitioner visits billed for headache and neck complaints were highly associated with subsequent VAD stroke. Cassidy concluded stroke due to VAD as a very rare event, and related to patients with headache and neck pain from VBA dissection seeking care before their stroke. The authors reported no evidence of excess risk of VBA stroke associated chiropractic care compared to primary care.

Other authors have reported that CAD, including VAD should be considered as a random and unpredictable complication of any neck movement including cervical manipulation. (Micheli, Paciaroni et al. 2010)

A systematic review assessing SMT for CAD concluded that the literature infrequently reports useful data toward understanding the association between chiropractic SMT, CADs and stroke. For example, in only 10% of case reports they reviewed, was the presence of neck pain or headache reported. Yet, this is the most commonly reported first symptom of VAD. In addition, in only 9% of case reports were co-morbidities (such as smoking, hypertension, migraine, etc) reported. Unfortunately, in only 6% was the location of the injury in the vertebral artery reported. Only one case report mentioned the presence of neck pain before the manual therapy occurred. Improving the quality, completeness, and consistency of reporting adverse events may improve our understanding of this important relation.

Another systematic review of SMT for CAD also concluded that the quality of studies on the relationship between chiropractic manipulation and CAD is very low. The study reported only a small association between chiropractic SMT and CAD. (Church, Sieg et al. 2016) They postulated the relationship may be explained by the high risk of bias and confounding in the available studies, and probably due to the known association of neck pain with CAD. They also concluded there was no convincing evidence to support a causal link between chiropractic manipulation and CAD.

All the case reports in this current study omitted important clinical information which is critical in assessing any possible trigger of the CAD. In particular (as discussed previously), the case reports had very limited discussion about the temporal relationship of the treatment with the adverse event.

CONCLUSION

This paper reviewed eight case reports on VAD following massage and highlighted why the term “Chiropractic” was incorrectly used in four reports. All the case reports reviewed were very limited in the clinical details necessary to determine the correct conclusion for the case. In cases where the term “chiropractic” was used, there was no clear evidence that SMT did trigger a VAD. In fact, in four cases, no SMT was given to the person with the VAD.

This paper also discussed the evidence assessing chiropractic as a trigger for CAD, and reaches the same conclusion as previous papers. Which is, the risk of VAD after chiropractic is no more than the risk associated with any activity involving neck movement. Past studies have shown “chiropractic” is often used incorrectly, and this paper has also found several more examples of inappropriate terminology.
Clinicians should always note significant risk factors that could inform them of appropriate diagnosis and management. The presence of risk factors (especially a connective tissue disorder) may preclude chiropractic SMT in the first instance, as it may be a contraindication to manipulation. Case reports cannot establish causality, especially in the absence of critical clinical information. Unfortunately, most VAD stroke is spontaneous with no obvious cause, which may leave clinicians open to spurious claims.(Elkady, Ghazal et al. 2020)

Case reports regarding CAD continue to lack detail and make significant methodological errors but may demonstrate a trivial activity such as massage could be an issue for clinicians to assess.

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