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Osteopathic management of an adult patient suffering from trigeminal neuralgia after a Chiari Type 1 decompression. A retrospective case report

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Abstract

Introduction

Herniation of the cerebellar tonsils through the foramen magnum into the cervical spinal canal with obliteration of the cerebellomedullary cistern is the primary feature of Arnold-Chiari type I (AC1) malformation. Posterior cranio-cervical decompression by opening foramen magnum and atlas lamina usually with corresponding dural and arachnoid opening is the surgical procedure most frequently used. Posteoperative pain impairing functional activity and quality of life is common and it is possible that manual treatments such as osteopathy may bring relief.

Objectives

To describe the examination, intervention, and outcomes for a patient suffering from trigeminal neuralgia after postoperative AC1 decompression surgery with osteopathic treatment.

Methods

A case report of a 29 year old man who presented with trigeminal neuralgia 5 years after decompression surgery. Encephalon and cervico-thoracic medulla MRIs were normal, describing only scar tissue following surgery. The trigeminocervical nucleus receives nociceptive inputs from both the trigeminal nerve and the first three cervical nerve roots which innervate the anatomical structures most affected during the surgery. Musculoskeletal scar tissue was targeted for osteopathic manipulative treatment based on its hypothesized influence on a sensitization state of the central nervous system. Manual desensitization techniques devised to reduce patient pain perception were proposed.

Results

A clinically significant decrease in overall pain as measured with a VAS occurred after the second treatment. Throughout the treatment period, an increase in cervical function was also described by the patient.

Conclusions

Pain perception in some patients suffering from trigeminal neuralgia following cranio-cervical decompression could be triggered by scar tissue and reduced by appropriate manual treatment.

1. Introduction

Rare presentation in osteopathic practice (see Annex 1).

Comprehension of neurophysiological processes that might be involved in pain perception of musculoskeletal origin.

A challenging differential diagnosis.

Stimulation for further research.

Patient received in private practice; oral and written approval for a retrospective case report (personal MRI not supplied).

2. Case presentation

- Patient details:

- 29-year-old male patient;

- Arnold-Chiari type 1 (see Figure 1) diagnosed and treated 5 years ago: posterior fossa decompression (see Annex 2);

- Symptoms: pain with pins and needles on face (left side) which started a month ago without provocative factors.

- Patient attitude: visit to neurologist; full neurological examination including new MRI (normal; only scar tissue)

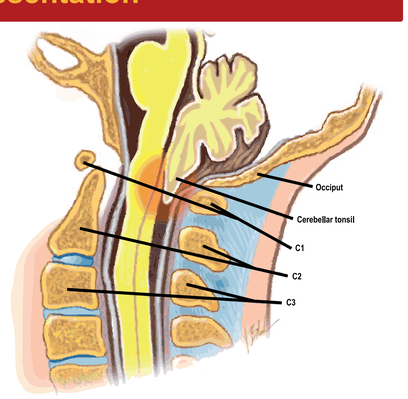

Figure 1. Arnold Chiari Malformation (type 1)

Annex 2: Surgical treatment : Posterior fossa decompression (see Figures 6 & 7)

- Step 1: Patient preparation: Head fixed in place by skull fixation
- Step 2: Skin incision
- Step 3: Bone removal: Skin and muscles are lifted off the bone and folded back; Craniectomy and laminectomy (C1)
- Step 4: Dural opening
- Step 5: Dural patch (duraplasty)
- Step 6: Closure

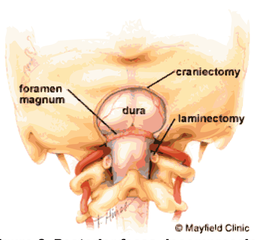

Figure 6. Posterior fossa decompression Bone removal

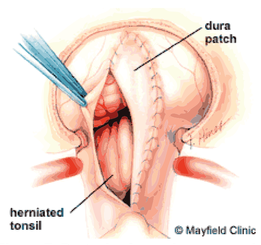

Figure 7. Posterior fossa decompression Duraplasty

3. Diagnosis & Intervention

Osteopathic diagnosis and treatment were recorded on a special form, the Outpatient Osteopathic SOAP Note Form (Sleszynski et al, 1999). Main areas of somatic dysfunctions were O-C1 & C1-C2 left, T1-T4 & R2-R4 left with left pterygoids & sub-occipitals muscle hypertonia (see Figure 2).

Signes cliniques					Région anatomique	Sévérité			Dysfonction(s) somatique(s) / système(s)	TTT		Techniques	Evolution			
Σ	S	A	R	T	testée	0	1	2	3	MS / SNS / SNP / LYM / CV / RESP / GI / FASCIAL / Autre	O	N		R	Am	I	Ag
					Crâne et Face				■	MS / Suture OM g; Asterion g; ATM g							
					Cervicales				■	MS + SNP + SNC / OA g; C1-C2 g; Muscles Sub-occipitaux		■	STT; MET; FASC			■	
		■	■		ThoraciqueT1-T4			■		MS + SNP / T1-T4 bilatéral		■	STT; HVT			■	
					ThoraciqueT5-T9													
					Thoracique T10-T12													
			■		Côtes					MS / R2-R5 g;		■	STT; HVT			■	
					Lombaires													
		■	■		Sacrum/pelvis			■		MS / SI bilatéral		■	ART; FASC		■		
					Pelvis / iliaque													
			■		Abdomen					GI / Diaphragme; Lames SRGVP		■	FASC		■		
					Membre supérieur D													
			■	■	Membre supérieur G		■			MS /GH g						■	
					Membre inférieur D													
					Membre inférieur G													

Figure 2. First visit examination and treatment (Outpatient Osteopathic SOAP Note Form)

Trigeminal neuralgia could be triggered with abnormal inputs from pain-sensitive somatic structures in the occipito-cervical area (Lay, 1975).

Aim of osteopathic treatment: correction of somatic dysfunctions with movement and function improvements and theoretical influence on abnormal neurological input.

Techniques used: indirect on the cervico-occipital area and direct on the upper thoracic area.

Outcomes – VAS (see Figure 3).

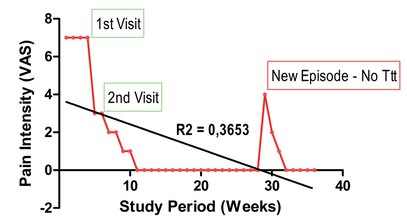

Figure 3. Pain intensity (VAS) during the study period

4. Discussion

4.1. Cervicogenic headaches

For cervical spine disorders to cause head pain there must be: (1) pain sensitive structures in the neck, (2) changes in the neck structures sufficient to cause stimulus to the pain receptors and (3) identifiable neurological pathways from the cervical spine to the head.

Present patient had a past history of surgery and scar tissue in the sub-occipital area.

Dura mater (see Figure 4):
- Extremely sensitive structure;
- Connective bridges between dura mater and rectus capitis minor muscle (see Figure 4);
- Adverse tension in the spinal dura can cause cervicogenic headache pain (Alix and Bates, 1999);
- Dura connections transmit forces from the cervical spine joint complex to the pain-sensitive dura (Hack et al, 1995).

Pain transmission in the trigeminal system (see Figure 5):
- Information from the C1-C3 neck structures is indistinguishable from trigeminal impulses;
- Classic neurological condition of "referred pain" (Rothbart, 1996).

Trigeminocervical nucleus can be viewed as the nociceptive nucleus for the entire head and neck (Bogduk, 1999).

Mechanisms underlying pain types (Sluka, 2009):
- Primary hyperalgesia;
- Referred pain;
- Secondary hyperalgesia;
- Allodynia;
- Temporal summation.

4.2. Differential diagnosis made using main positive pain provocative tests

Diagnosis challenging in a post-surgical context:

(1) Central sensitization (passive dural stretching, allodynia & hyperalgesia, bilateral V emergences);

(2) Trigeminal neurogenic pain (unilateral V emergences);

(3) Somatic referred pain (compression, stretching and contraction with resistance: joints and latent trigger points);

(4) Radicular projected pain from upper cervical (passive cervical extension, passive stretch of the cervical nerve roots).

Combination of different concepts:

- Movement of pain sensitive structures in the vertebral canal and intervertebral foramina (Maitland, 1980);
- Adverse mechanical tension in nervous system (Butler, 1989);
- Neurodynamics (Shacklock, 1995);
- Osteopathic diagnosis (Sammut and Searle-Barnes, 2002).

Tissue causing symptoms model also challenged: fall of the postural–structural–biomechanical model (Lederman, 2010) and the concept of ideomotor therapy (McCarthy et al, 2007).

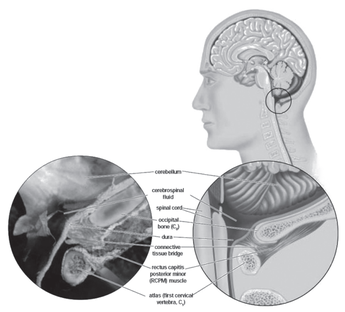

Figure 4. Connective bridges between dura mater and rectus capitis minor muscle

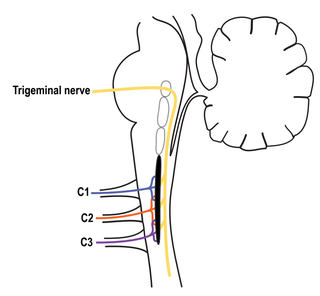

Figure 5. Convergence of trigeminal and C1-C3 inputs to the trigeminocervical nucleus

5. Limitation of case report

Patient managed in a non-controlled environment.

Natural progression of disease or dysfunction may explain results.

Impossible to conclude that a particular management strategy will be effective for other patients with the same condition.

This hypothesis, that osteopathy can bring relief, can only be tested using experimental clinical trials.

6. Conclusion

Consider the scar tissue in a post-surgical context as a probable source of aberrant nociceptive information and/or abnormal biomechanical patterns.

Could have triggered somatic dysfunctions.

Importance of clinical examination to differentiate possible sources of aberrant nociceptive/ mechanoreceptive inputs.

Trigeminal neuralgia could be managed with appropriate manual treatment.

Annex 1: Osteopathic medicine

Osteopathic medicine is an approach to healthcare that emphasizes the role of the musculoskeletal system in health and disease; its paradigm is based on four key principles[1]: (1) the body is a unit, (2) the body possesses self-regulatory mechanisms, (3) structure and function are reciprocally interrelated and (4) rational therapy is based on the previous tenets.

A key identifiable feature of osteopathic medicine is the concept of somatic dysfunction defined as a functional disturbance of the tissues of the musculoskeletal system and related vascular and neurological components, which can be treated by manipulation[2]. Clinical symptoms associated with somatic dysfunction are commonly represented by the acronym "TART" (Tenderness, Asymmetry, Restriction and Tissue texture change)[3]. According to its commonly used neurophysiological model and depending on the patient's condition, the somatic dysfunction may be causative, perpetuating or a combination[4]. The evaluation of the patient's capability for a homeostatic response and the interpretation of theoretical underlying physiopathological processes with the palpation of components of the somatic dysfunction guide the osteopath for treatment strategies[4]. A wide range of manual techniques described in the Authorized Osteopathic Thesaurus[5] are used for the treatment of somatic dysfunctions by the two categories of osteopathic practitioners, the osteopaths who provide only osteopathic manipulative treatments (OMT) and the osteopathic physicians who are fully licensed to practice medicine and provide OMT, as they are defined by the World Health Organization's (WHO) draft report Guidelines on Basic Training and Safety in Osteopathy[6]. These practitioners have a first contact status in every country where osteopathy has been recognized and regulated by Law.

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