

NATIONAL INSTITUTE FOR CLINICAL EXCELLENCE

INTERVENTIONAL PROCEDURES PROGRAMME

Interventional procedure overview of selective peripheral denervation for cervical dystonia

Introduction

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee (IPAC) advise on the safety and efficacy of an interventional procedure previously reviewed by SERNIP. It is based on a rapid survey of published literature, review of the procedure by Specialist Advisors and review of the content of the SERNIP file. It should not be regarded as a definitive assessment of the procedure.

Date prepared

This overview was prepared by Bazian Ltd in December 2002.

Procedure name

Selective peripheral denervation for cervical dystonia

Specialty society

British Orthopaedic Association

Society of British Neurological Surgeons

Indication(s)

Cervical dystonia is a condition in which the muscles of the neck contract painfully and cause twisting of the head. It may be congenital, but may also occur at any age. Cervical dystonia may persist for several years, and sometimes for life. About 20% of people will recover without treatment.

Cervical dystonia varies according to which muscle groups are affected. The head may be pulled backwards (retrocollis), forwards (anterocollis) or to the side (torticollis).

The cause of cervical dystonia is not known. In children, it is sometimes associated with congenital abnormalities of head shape or spine.

Summary of procedure

Traditional treatment for cervical dystonia includes physiotherapy, drugs to reduce spasm, injections of botulinum toxin and brain surgery. Peripheral denervation has been advocated as an alternative, especially in people who have not responded to other treatments.

Selective peripheral denervation is a surgical approach that involves cutting the nerves to the muscles of the neck through a large skin incision. The surgery is carried out under general anaesthetic. The procedure varies according to the muscle groups affected, and whether it involves cutting of the muscles.

Literature review

Appraisal criteria

Studies on the selective peripheral denervation of cervical dystonia with clinical outcomes were included. UK studies reporting on safety and efficacy on patients with cervical dystonia were also included.

List of studies found

One systematic review was found.¹

No controlled studies were found.

Twelve case series were found including at least 30 people. The table below gives details of the five largest and most applicable case series.²⁻⁶

References to smaller studies are given in the Appendix.

Summary of key efficacy and safety findings

Study details	Key efficacy findings	Key safety findings	Key reliability and validity issues
Dent THS¹ Systematic review Search date: March 2002	- found no controlled studies 'no reliable evidence' to compare procedure with other treatments	'no reliable evidence' to assess safety of procedure	Good quality systematic review: Search date and primary sources described Selection criteria for studies described Quality of included studies assessed
Bertrand CM² Case series Montreal, Canada 1976 onwards (published 1993) n=260, age range 29 to 61 years 'most' patients pre-treated with botulinum toxin Inclusion criteria: - torticollis present at least 2 years - stable symptoms - at least 4 months since last botulinum injection - abnormal movements 'very active' Follow up: 5 years, n=167 10 years, n=64	Outcome at follow up (time unspecified): - excellent: 40% - very good: 48% - fair: 10% - poor: 2%	- death: none - occasional 'tic-like' pain: 3 people - tonsillar abscess: 1 person - transient swelling of neck: 'few' people - pins and needles or sensation 'tightness' or 'fullness': 'few' people	Uncontrolled case series Included in systematic review¹ Not clear how efficacy outcome assessed

Chen X³ Case series Wuhan, China 1969 to 1998 - n=207 had selective denervation and transection or resection of neck muscle, average age 39 (range 5 to 73) Inclusion criteria: - spasmodic torticollis stable for 1-2 years Follow up: 2 to 29 years	Outcome at follow up (time unspecified): - excellent: 71% - very good: 17% - fair: 9% - poor: 3%	- deaths: none - sensory loss limited to distribution of greater occipital nerve: 'most patients' - slight atrophy of unilateral posterior region of neck: number not provided	Uncontrolled case series Included in systematic review¹ 381 people had operation; results reported for 207; losses to follow up not accounted for Long follow up How and when outcomes assessed not described Operation included muscle transection or resection as well as selective denervation
Braun V⁴ Case series Gunzburg, Germany 1988 to 2001 n=155 had selective denervation 47 non-responders to botulinum toxin 71 with initial response to botulinum, but who developed antibodies Inclusion criteria: - conservative treatment unsuccessful - symptoms at least 1 year Mean follow up: 33 months (range 3 to 124 months)	At follow up (n=140): - satisfied with operation: 73% - operation 'ineffective': 27% - complete relief of symptoms: 13% 'significant' relief of symptoms: 36% 'moderate' improvement: 24% - no improvement: 14% - mean TWSTR (mobility, pain and handicap) score reduced from 48/85 to 33/85	- deaths: none - sensory loss: 140 (all patients) - haematoma: 3 people - transection of spinal accessory nerve: 2 people - damage to trapezius muscle: 2 people - difficulty swallowing for several months: 4 people - laryngeal narrowing requiring temporary tracheostomy: 1 person - nerve pain: 3 people - tremor worse: 2 people - recurrence: 11% - second procedure required : 15	Uncontrolled case series 10 patients lost to follow up Long follow up Outcomes assessed by patient questionnaires

Munchau, A.⁵ Case Series London, UK 1997-2000 n=37 with cervical dystonia present in whom botulinum toxin injection failed Mean follow up: 16.7 months (range 12 to 75 months)	At follow up (n=140): • TWSTRS 68% improvement (12 months) • 30% reduction of TWSTR score • Severity scores reduced 20% (12 months) • Disability scores were reduced by 40% at 1 year • Increase in pain at 6 months • Outcome after surgery was superior to BT injection 70% • Improvement in some psychological measures	• transient balance problems: 3 people • transient dysaesthesiae 7 people • Degree of sensory loss: (all patients) from ramisectomy 21% reported loss as 'discomforting' • transient trapezius paresis 1 patient • Worsening dystonia 2 patients • Developed difficulty in swallowing 7 patients, swallowing worsened 5 patients • Incomplete denervation 2 patients	Some blinded assessment down with TWSTRS Substantial range of follow-up in patients Sub-sample reported on psychological outcomes n=12
Meyer, C.H.A.⁶ Case Series Birmingham, UK n=30 with cervical dystonia present for 2-27 months • Unresponsive or non-responders to botulinum toxin Median follow up: 26 months (range 12 to 75 months)	At follow-up Percentage Improvement • TWSTRS 28% • ADL 22% • Impairment 28% • Lifestyle 29% • Incapacity 28%	• Not reported	Little information provided Safety information was not recorded ADL (activities of daily living), impairment, lifestyle and incapacity also measured by Australia's Department of Veteran's Affairs.

Validity and generalisability of the studies

The studies were carried out in settings applicable to the UK.

In common with the identified systematic review¹, only case series were found. Follow up in all case series was fairly long. In two of the case series, information on how outcomes were measured was limited.^{2,3} In one case series, transection or resection of neck muscles was carried out in addition to selective denervation.⁴

Specialist advisor's opinion / advisors' opinions

Specialist advice was sought from consultants who have been nominated by their Specialist Society or Royal College.

- careful patient selection would improve the efficacy of the procedure
- potential adverse events include difficulty in swallowing
- the usual potential complications of surgery such as infection and haemorrhage.

References

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2. Bertrand CM. Selective peripheral denervation for spasmodic torticollis: surgical technique, results, and observations in 260 cases. *Surgical Neurology* 1993; 40: 96-103
3. Chen X, Ma A, Liang J, Ji S, et al. Selective denervation and resection of cervical muscles in the treatment of spasmodic torticollis: long-term follow-up results in 207 cases. *Stereotactic and Functional Neurosurgery* 2000; 75: 96-102
4. Braun V, Richter HP. Selective peripheral denervation for spasmodic torticollis: 13-year experience with 155 patients. *Journal of Neurosurgery (Spine)* 2002; 97 (2 Suppl): 207-12
5. Munchau A, Palmer JD, Dressler D, O'Sullivan JD, et al. Prospective study of selective peripheral denervation for botulinum-toxin resistant patients with cervical dystonia. *Brain* 2001; 124: 769-83
6. Meyer, C.H.A. Outcome of selective peripheral denervation for cervical dystonia. *Movement Disorders* 2001, 44-7.

Appendix: References to studies not described in the table

Reference	Number of study participants
Bertrand C, Molina-Negro P, Bouvier G, Gorczyca W. Observations and analysis of results in 131 cases of spasmodic torticollis after selective denervation. <i>Applied Neurophysiology</i> 1987; 50: 319-23	131
Bertrand CM, Molina-Negro P. Selective peripheral denervation in 111 cases of spasmodic torticollis: rationale and results. <i>Advances in Neurology</i> 1988; 50: 637-43	111
Lobato EB, Black S, De Soto H. Venous air embolism and selective denervation for torticollis. <i>Anesthesia & Analgesia</i> 1997; 84: 551-3	100
Hamby WB, Schiffer S. Spasmodic torticollis; results after cervical rhizotomy in 80 cases. <i>Clinical Neurosurgery</i> 1970; 17: 28-37	80
Taira T, Kobayashi T, Takahashi K, Hori T. A new denervation procedure for idiopathic cervical dystonia. <i>Journal of Neurosurgery (Spine)</i> 2002; 97 (2 Suppl): 201-6	61
Xinkang C. Selective resection and denervation of cervical muscles in the treatment of spasmodic torticollis: results in 60 cases. <i>Neurosurgery</i> 1981; 8: 680-8	60
Braun V, Richter HP. Selective peripheral denervation for the treatment of spasmodic torticollis. <i>Neurosurgery</i> 1994; 35: 58-62	50
Krauss JK, Toups EG, Jankovic J, Grossman RG. Symptomatic and functional outcome of surgical treatment of cervical dystonia. <i>Journal of Neurology, Neurosurgery & Psychiatry</i> 1997; 63: 642-8	46
Braun V, Richter HP. Selective peripheral denervation in patients with spasmodic torticollis. <i>Stereotactic and Functional Neurosurgery</i> 1991; 57:113-22	35
Chawda SJ, Munchau A, Johnson D, Bhatia K, Quinn NP, Stevens J et al. Pattern of premature degenerative changes of the cervical spine in patients with spasmodic torticollis and the impact on the outcome of selective peripheral denervation. <i>Journal of Neurology, Neurosurgery & Psychiatry</i> 2000; 68: 465-71	34