

Outcomes of submandibular duct relocation: a 15-year experience

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Abstract

Drooling is common in patients with neurological disability and a major factor affecting quality of life. Management of this problem is best carried out by a team approach using surgical and non-surgical methods. Submandibular duct relocation is a commonly performed procedure with low complication rate. This procedure has been carried out in 56 patients over the last 14 years at the Belfast City Hospital by the senior author. All the patients underwent physiotherapy for six months before they were selected for surgery. All the patients were over five years of age and most had severe neurological impairment. For the purposes of this study, all the patients were followed by a questionnaire regarding symptomatic improvement, parent satisfaction and complication rate. All case notes were also reviewed retrospectively.

Parental satisfaction was high and drooling was significantly reduced in 49 cases. The main complication was ranula formation seen in five cases. The most significant area of parental concern was post-operative pain. It is important to counsel the parents regarding the post-operative pain relief as well as failure rate of the procedure. It can be concluded that this procedure is a safe and highly successful procedure, which significantly improves the quality of life.

Key words: Sialorrhoea; Surgical Procedures; Operative; Treatment Outcome

Introduction

Sialorrhoea is one of the major causes of poor quality of life in patients with chronic neurological disability. The continuous drooling results in soiling of clothes, constant facial irritation and the unsightly nature results in segregation of these patients from other members of society. The main problems are a lack of coordinated control of orofacial, head and neck musculature combined with poor posture and have been reported to be significant in patients with cerebral palsy.¹ Drooling is also a persistent feature in other cases of congenital and acquired neurological disorders. Its significance on the lives of both patients and carers should not be underestimated, with significant stigma and social isolation being experienced by both.

The significance of drooling and the therapeutic recommendations depend on the clinical status of the individual affected and the degree of sialorrhoea.² There are various modalities of treatment available including behavioural therapy, oral motor therapy, physiotherapy, pharmacotherapy and surgery. Physiotherapy is aimed at correction of head and jaw posture. This is also used for increasing the mobility and strength of tongue and lip movement.³ Pharma-

cotherapy is of use in the short-term but confers little long-term benefit. Physiotherapy has a long-term benefit in a small number of cases.

There have been many surgical approaches described in the literature including parotid duct rerouting and submandibular gland excision,⁴ parotid duct ligation with submandibular gland excision,⁵ submandibular duct relocation² or submandibular duct excision⁶ and transtympanic neurectomy.⁷ In our institution the surgical procedure of choice has been submandibular duct relocation for those patients with reasonable swallowing activity. For those with significant dysphagia, transtympanic neurectomy and division of the chorda tympani is employed. All new referrals are assessed jointly by the consultant otolaryngologist and Speech and Language therapist. Assessment is made of the neurological development, ENT status, posture, and risk of aspiration for each patient. An attempt is made to quantify the problem in terms of soiling of clothing and parental views on the extent of the problems are sought. Where no other ENT solution is immediately required all patients are referred for a minimum of six months physiotherapy. At the review appointment any progress is noted. If there has been a failure to improve then a decision is made on further management. Where aspiration risk

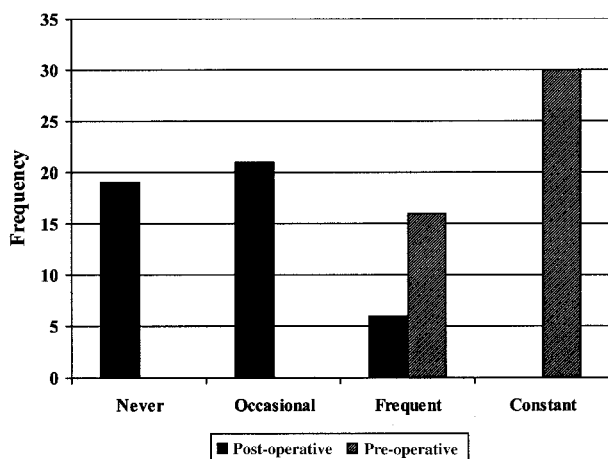


FIG. 1

Frequency of drooling (n = 46).

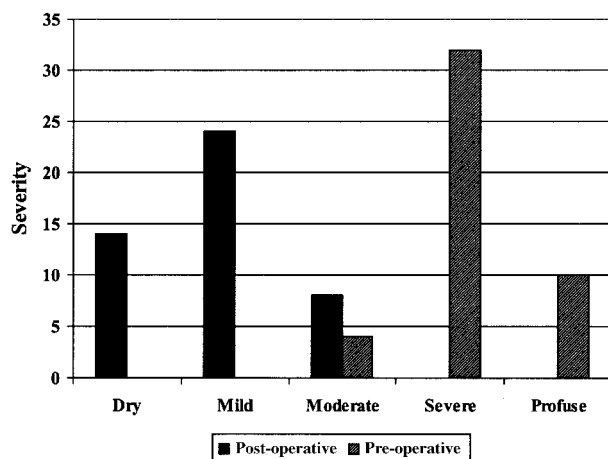


FIG. 2

Severity of drooling (n = 46).

is low, the patient is old enough and parents are keen for intervention then submandibular duct relocation may be offered.

- This paper is based on a retrospective review of 56 children who have undergone treatment for sialorrhoea over a period of 15 years
- The paper describes the surgical technique and the complications that developed as well as the results of a post-operative questionnaire
- Tonsillectomy was performed in all cases and the duct repositioned to open through the anterior faucial pillar. In later procedures the sublingual glands were excised to reduce the risk of ranula formation

Methods

Between 1987 and 2002, 56 patients underwent submandibular duct relocation for control of drooling at our centre, all the patients having initially undergone physiotherapy for six months. All the cases noted were reviewed retrospectively. We looked at age at the time of operation, aetiology of neurological impairment, the severity of sialorrhoea before and after the operation, any subsequent operations and the complication rate. A questionnaire survey was conducted to determine the symptomatic improvement, parent/carer satisfaction and the complication rate. The questionnaire is shown in the appendix. Non-responders were followed up by telephone. The first two questions were based on severity of drooling and oro-motor dysfunction. The last two questions were opened to have feedback on the carer's perceived expectations compared to the outcomes.

All the operations were performed under general anaesthetic. The senior author routinely performed tonsillectomy as the initial step in the procedure. This was to reduce the technical difficulties of the procedure.⁸ The opening of the submandibular ducts

was mobilized with a surrounding cuff of mucosa. The dissected ducts were tunnelled submucosally through the floor of mouth and repositioned to the anterior pillar of the tonsillar fossa. In the later cases the sublingual glands were excised in the same procedure. This was to reduce the rate of ranula formation.

Fifty-six patients underwent the procedure between 1987 and 2002. There were 36 boys (64 per cent) and 20 girls (36 per cent). All of the patients who underwent this surgery were children less than 18 years of age. The youngest age was five. The mean age was eight years. Table I shows the various forms of neurological disability seen in our patients. Cerebral palsy was the commonest condition, found in 32 out of 56 (57 per cent) children.

Results

The retrospective review of the case notes showed that a majority of the patients achieved a satisfactory reduction in sialorrhoea (49/56, 87 per cent). Of the seven failures, four patients underwent subsequent tympanic neurectomy with good results. In the questionnaire study, 56 questionnaires were sent to the parents and carers. There were 46 replies (82 per cent). This was mainly to see the long-term outcomes of the procedure and obtain a better appreciation of the views of carers. The results are summarized in Figures 1 and 2.

The result shows that 38 patients out of 46 had long-term satisfactory reduction of sialorrhoea (82 per cent) (Figures 1 and 2). This shows that there is significant long-term improvement in quality of life with this procedure. Of the eight failures, three cases showed short-term improvement and four of the patients underwent subsequent procedures as shown above. The most common reason (10 out of 46) for parental

TABLE I
TYPES OF NEUROLOGICAL DISABILITY SEEN IN PATIENTS

Cerebral palsy	32
Non-specific mental retardation	10
Post-encephalitic	5
Downs syndrome	3
Others	6

dissatisfaction was post-operative pain. Therefore it is important to counsel the parents and carers regarding the failure rate and complication of the procedure. Our study showed a majority of parents/carers (85 per cent) would recommend the procedure.

The most common surgical complication was ranula formation (five cases). Ranulas were treated by excision of the sublingual glands. Other complications were dental problems (periodontal disease) in two cases, cracked lips in two cases, one secondary haemorrhage and one case of post-operative chest infection. The senior author has performed excision of the sublingual glands along with the primary procedure in 20 cases. The ranula rates was nil in this group.

Discussion

Sialorrhoea is commonly seen in neurologically impaired children. The management includes both non-surgical and surgical means. The non-surgical means include physiotherapy to improve head posture, tongue movement, lip closure, jaw positioning and stabilization.⁹ This does have a long-term success rate. Other methods include pharmacotherapy using anticholinergic and antihistamine drugs such as glycopyrrolate.¹⁰ This is not a satisfactory long-term solution as it takes high doses of the drugs to produce the desired effect, thereby increasing the chances of side-effects. Surgery is the treatment of choice in patients with severe drooling unresponsive to physiotherapy. There have been many operations described in the literature in the last 30 years. Bilateral submandibular duct relocation is the most widely performed operation. The advantages are a scarless procedure, low complications and high success rate. The main rationale behind this procedure is that the submandibular gland contributes the bulk secretions in the resting phase.⁹ In agreement with other authors,^{11,12} this study has found that submandibular duct relocation is beneficial in a persistent fashion in the majority of patients who are suitable for surgical management of drooling. The long-term success rates of this centre are comparable to others, 79.6–92 per cent.^{3,13} There are other procedures such as Wilkie's procedure which have comparable success rates, but they are technically more difficult with a higher risk of post-operative complication. One potential problem with submandibular duct relocation is dryness in the anterior third of the mouth. This may lead to dental problems as shown in our study (two cases of periodontal diseases and two cases of cracked lip) although the rates are not high. The relocation of ducts is a more physiological procedure compared to complete excision as it avoids complete dryness of mouth. One of the other reasons for success of the relocation procedure is that saliva coming in contact with the base of the tongue initiates a swallow reflex.²

There were five cases of ranula formation in this series. They were treated by excision of the sublingual salivary glands. The senior author now routinely performs excision of the sublingual glands during the primary procedure although this was not

the initial practice. Tympanic neurectomy is usually performed as a secondary procedure in failed cases. There were four cases of tympanic neurectomy with good results. Long-term results of this procedure show a failure rate of 25–50 per cent¹⁴ when performed as a primary procedure, and it is likely that the good results obtained were due to the fact that relocation had been previously performed. Tympanic neurectomy is used as a primary procedure where the swallow reflex is unsafe. It can be concluded therefore that the relocation of submandibular ducts is an efficacious treatment for intractable drooling. It has acceptable complication rates. The operation carries a high parent satisfaction rate and can significantly improve the quality of life.

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