

# Benefits of botulinum toxin associated to swallowing therapy in patients with severe dysphagia

## *Benefícios da aplicação de toxina botulínica associada à fonoterapia em pacientes disfágicos graves*

Fernanda Teixeira Menezes<sup>1</sup>, Katia Alonso Rodrigues<sup>1</sup>, Isabella Christina de Oliveira Neto<sup>1</sup>,  
Brasília Maria Chiari<sup>2</sup>, Dayse Manrique<sup>3</sup>, Maria Inês Rebelo Gonçalves<sup>2</sup>

### ABSTRACT

Case report with the aim to characterize the benefits of botulinum toxin injection into salivary glands in association with swallowing therapy in patients with severe dysphagia. The medical records of five neurological patients (four male and one female, aged between 17 and 70 years) who exclusively used alternative feeding were analyzed. Four patients were tracheostomized. Inclusion criterion was to present severe dysphagia associated to clinical manifestations of drooling and/or sialorrhea with significant aspiration of saliva, restricting the improvement in swallowing rehabilitation. Data were collected before and after intervention associated with botulinum toxin injection, regarding the following aspects: mobility and strength of oropharyngeal structures (lips, tongue and cheeks), laryngeal elevation, severity degree of dysphagia, use of alternative tube feeding and tracheostomy. After swallowing therapy, four patients showed improvement in mobility and strength of the lips, tongue, cheeks and larynx. Four patients presented functional swallowing and one of them modified had the severity degree of dysphagia changed. Therefore, most patients were able to receive exclusive oral feeding, and only one remained on combination of gastrostomy and oral feeding with pasty consistence. All tracheostomized patients had the tracheostomy cannula removed. The study showed that the treatment described contributed to swallowing rehabilitation, reintroduction of oral feeding, and withdrawal of the tracheostomy cannula.

**Keywords:** Deglutition disorders/rehabilitation; Botulinum toxins, type A/therapeutic use; Rehabilitation; Saliva/drug effects; Salivary glands; Case studies

### INTRODUCTION

Sialorrhea can be caused by abnormal sensitivity and/or oral motor function due to neuromuscular dysfunction. In children and adult population, excessive salivation can occur in cases of mental retardation, cerebral palsy, Parkinson's disease, stroke, central nervous system tumor (CNS TU), head and neck post-surgery, amyotrophic lateral sclerosis, and other neurological diseases<sup>(1-6)</sup>.

Sialorrhea followed by drooling or stasis of saliva in the oral cavity is a clinical sign of swallowing disorder. This factor is socially unpleasant<sup>(7)</sup> and frequently limits the performance of swallowing rehabilitation. Drooling and sialorrhea can make some exercises proposed during the swallowing rehabilitation difficult to perform. In addition, individuals who use plastic tracheostomy tube with cuff may present discomfort to deflate it, restricting the realization of vocal exercises of laryngeal closure to optimize the lower airway mechanism of protection and laryngeal elevation.

Treatments to sialorrhea can be conservative (postural changes, biofeedback) or non-conservative as the use of anticholinergic drugs, antiparkinsonian drugs, surgical treatment of salivary ducts or glands, radiotherapy and application of botulinum toxin type A into the salivary glands<sup>(3)</sup>. Botulinum toxin type A has been used in the salivary glands of patients with residue of saliva in the oral cavity and / or pharyngeal recesses, in order to reduce the risk of aspiration and improve the quality of life<sup>(1,2,4,6,8)</sup>.

The swallowing rehabilitation associated with botulinum toxin in the treatment of oropharyngeal dysphagia has been described in literature as a beneficial treatment. It is characteri-

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**Conflict of interests:** None

(1) Serviço Integrado de Fonoaudiologia, Hospital São Paulo, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.

(2) Department of Speech-Language Pathology and Audiology, Universidade de Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.

(3) Associação de Assistência à Criança Deficiente – AACD – São Paulo (SP), Brasil.

**Correspondence address:** Fernanda Teixeira Menezes. R. São José 887/54, Alto da Boa Vista, São Paulo (SP), Brasil, CEP: 04739-001. E-mail: contato@fernandatmenezes.com.br

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zed by oropharyngeal muscles exercises and postural changes which improve the swallowing mechanism<sup>(3,9,10)</sup>.

Authors<sup>(11)</sup> performed a study of patients with Parkinson's disease, evaluating the efficiency of swallowing rehabilitation associated with botulinum toxin to reduce saliva in the oral cavity. The program of swallowing therapy was designed to make the patient train to control the frequency of swallowing saliva. The results showed reduction of the sialorrhea and the authors concluded that the speech pathologist can help in this situation, making the act of swallowing conscious and increasing the frequency of swallowing.

Other authors<sup>(12)</sup> reported the experience of many professionals who have developed a work at a Pediatric Rehabilitation Center with 1487 children in order to decrease sialorrhea. A great number of treatments have been proposed such as swallowing therapy, medication, surgery of salivary glands and ducts or botulinum toxin injection. The authors have observed that the swallowing rehabilitation was essential when associated with other treatments.

Despite the importance of studies reporting the association of treatments, there is still a lack of accurate description in literature of what the changes in swallowing are. Thus, this study aimed to characterize the benefits of botulinum toxin injection associated with swallowing therapy in patients with severe dysphagia.

**CLINICAL CASE PRESENTATION**

This study was reviewed and approved by the Research Ethics Committee of the Universidade Federal de São Paulo, number 1003/10. Since the research was retrospective and did not have direct contact with the patient, there was no need to use the Free and Informed Consent Term.

Retrospective study of medical records of patients evaluated and treated at the Dysphagia Ambulatory and at the Pediatric Oncology Institute. The inclusion criteria were patients with severe, i.e., with clinical manifestations such as drooling and/or sialorrhea with aspiration of saliva, restricting the improvement of swallowing therapy. All patients were subjected to swallowing therapy associated with botulinum toxin injection.

Initially, data collected were the identification of each patient. As for the clinical assessment of swallowing, data were collected before and after swallowing therapy associated with botulinum toxin, based on mobility and strength of oropharyngeal structures (lips, tongue, cheeks), laryngeal elevation, dysphagia severity degree, use of alternative tube feeding and tracheostomy.

It is noteworthy that, for all patients analyzed, swallowing therapy started after the botulinum toxin, ranging from three to seven days, according to the patient's clinical conditions and beginning of ambulatory treatment. The dose injected in the submandibular and parotid glands were 20 and 40 units (U).

The five neurological patients had the following diagnoses: tumor of the central nervous system characterized by bulb tip lesion (two patients), Parkinson's disease (one patient), stroke (one patient) and polyneuropathy of critically ill patients (one patient). All of them were using exclusively alternative tube

feeding for over three months (nasogastric tube or gastrostomy). Four patients were tracheostomized without mechanical ventilation. Three of them used a plastic cannula with cuff inflated and one used a metallic cannula.

In clinical assessment before swallowing therapy, all patients had disorders in mobility and strength of the lips, tongue and cheeks. Patients were not able to make movements with amplitude, accuracy and coordination of lips, tongue and cheeks. As for strength, the patients could not use it against the motion proposed by the speech pathologist, which shows subjectively reduction of the tonus. After therapy an improvement of these features was observed (Table 1).

**Table 1.** Distribution of the variables studied before and after swallowing therapy associated with botulinum toxin

	Variables	Pre	Post
Dysphagia severity degree	Severe dysphagia	4	0
	Moderate dysphagia	1	1
	Mild dysphagia	0	0
	Functional swallow	0	4
Alteration of OMO	Mobility and strength	5	1
Adequate OMO	Mobility and strength	0	4
Feeding mode	Nasogastric tube	2	0
	PEG	3	0
	Total oral intake	0	4
	Partial OF + PEG	0	1
Tracheostomy	Plastic with cuff	3	0
	Metallic	1	0
	Without	1	5

**Note:** OMO = oral myofunctional organs; PEG = percutaneous endoscopic gastrostomy; OF = oral feeding

Concerning dysphagia severity degree, all patients had severe dysphagia before therapy. After treatment, there was a recovery of functional swallowing in most cases. As for nutrition and hydration, all patients were using exclusive alternative tube feeding before therapy. After therapy, most of the patients reestablished exclusive oral feeding. Initially, most of the patients used tracheostomy and after therapy all patients restored oronasal breathing, with decannulation (Table 1).

The swallowing therapy lasted for three to twelve months, according to the case. The improvement was gradual. In the beginning, the patient should be able to swallow saliva with safe. After it the swallowing training with food was started. When the patient could swallow food trained during swallowing therapy without presenting any clinical signs of supraglottic penetration an/or tracheal aspiration, such consistency was released for oral feeding.

**DISCUSSION**

The main objective of swallowing rehabilitation is to restore the swallowing of saliva and reintroduce the oral feeding safely when possible<sup>(13)</sup>. In this study, it was observed that the sample consisted of critically ill patients with severe dys-

phagia. These patients had a significant difficulty concerning swallowing of saliva, with increased risk of pneumonia. The botulinum toxin type A in the salivary glands was beneficial in this sample, allowing a reduction in the accumulation of saliva in the oral cavity and pharyngeal recesses and later onset of swallowing therapy.

After application of botulinum toxin injection, the swallowing therapy occurred weekly and consisted of myofunctional and vocal exercises to help glottal closure, laryngeal elevation and anteriorization. The indirect therapies (without food) and direct (with food) were selected according to the needs of each case<sup>(13)</sup>. Swallowing therapy aimed to coordinate the oral and pharyngeal phases of swallowing and reintroduce oral feeding safely.

As soon as the patients were able to manipulate and swallow the saliva without risk of aspiration, it was possible to verify whether they felt comfortable to stay with the cuff deflated or not. When this stage was reached, the time spent with deflated cuff was gradually increased. Thus, it was possible to make the digital occlusion of the tracheostomy tube and perform vocal exercises to glottal closure and laryngeal elevation, in order to protect the lower airways. Considering our sample, four patients improved mobility and strength of the lips, tongue, cheeks and larynx (Table 1).

The techniques have allowed the improvement of swallowing saliva, and then direct therapy was initiated, i.e., the training of swallowing with controlled volume of food. The first consistency used was pasty, to provide better oral control<sup>(13,14)</sup>. After satisfactory performance, the volume was increased and the consistency was modified to thickened liquid, thin liquid, semi solid and solid respectively. Four patients had the swallowing rehabilitated after swallowing therapy (functional swallowing) and one patient has changed the dysphagia severity degree from severe to moderate (Table 1). Thus, most of the patients were able to receive exclusive oral feeding and one remained on a combination of gastrostomy and pasty oral feeding (Table 1).

Another benefit achieved with swallowing therapy was

the decannulation. In this study, four patients were using tracheostomy before therapy. After the swallowing therapy associated with botulinum toxin injection, all patients had the tracheostomy tube removed and occlusion of the tracheostomy (Table 1). Additionally, it was possible to establish oral communication providing the patient's participation during the therapeutic process, and ensuring their rehabilitation and improving quality of life.

In our study follow-up time ranged from three to 12 months. This variation is justified by different diseases, clinical status, dysphagia severity degree and therapy frequency. Another aspect observed during the treatment was the improvement in swallowing function during the effect of botulinum toxin. A single injection of the drug was enough for the four patients to have conditions for participating of the swallowing therapy and reintroduction of oral feeding. Only one patient who had degenerative neurological disease (Parkinson's Disease) required additional injection. Perhaps the combination of the two treatments may have avoided the additional injection of the drug in question and, therefore, further studies are needed. Several authors have reported that the effect of botulinum toxin can vary from a period of three to seven months<sup>(2,4,6,15)</sup>.

Considering the results, we observed that the combination of the two treatments allowed the improvement of the swallowing of the patients. Thus, it is extremely important that the speech pathologist is aware of treatment alternatives for the reduction of sialorrhea, in order to integrate swallowing therapy to the treatment. This treatment option improves safe swallowing, prevent pneumonia, malnutrition and dehydration.

## FINAL COMMENTS

The benefits of botulinum toxin type A associated with swallowing therapy in patients with severe dysphagia are: reduction of the sialorrhea; improvement of mobility and strength of oropharyngeal structures; rehabilitation of swallowing; reintroduction of oral food and decannulation.

## RESUMO

Estudo de casos para caracterizar os benefícios da aplicação de toxina botulínica em glândulas salivares, associada à fonoterapia em pacientes disfágicos graves. Foram analisados cinco prontuários de pacientes neurológicos, em uso exclusivo de via alternativa de alimentação, com idades entre 17 e 70 anos, sendo quatro do gênero masculino e um do gênero feminino. Do total, quatro pacientes eram traqueostomizados. Foi considerado como critério de inclusão apresentar disfagia grave, com manifestações clínicas de escape extra oral e/ou acúmulo de saliva em cavidade oral e aspiração traqueal maciça de saliva, com limitação da fonoterapia. Quanto à avaliação clínica da deglutição, foram coletados dados pré e pós-fonoterapia associada à aplicação de toxina botulínica, quanto aos seguintes aspectos: mobilidade e força das estruturas orofaríngeas (lábios, língua, bochechas), elevação laríngea, grau da disfagia, uso de via alternativa de alimentação e traqueostomia. Quanto aos resultados pós-fonoterapia foi observado, em quatro pacientes, melhora da mobilidade e força de lábios, língua, bochechas e laringe. Quatro pacientes apresentaram deglutição funcional e um teve modificação do grau de gravidade da disfagia. Desta forma, a maioria foi capaz de receber dieta exclusiva por via oral e apenas um permaneceu com dieta mista, ou seja, gastrostomia e dieta via oral na consistência pastosa. Todos os pacientes traqueostomizados tiveram a cânula de traqueostomia removida. O estudo mostrou que o tratamento descrito acima contribui para a reabilitação da deglutição, reintrodução de alimentos por via oral e retirada da cânula de traqueostomia.

**Descritores:** Transtornos de deglutição/reabilitação; Toxinas botulínicas tipo A/uso terapêutico; Saliva/efeitos de drogas; Glândulas salivares; Estudos de casos

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