

IMPACT OF OROTRACHEAL INTUBATION ON A POST STROKE INDIVIDUAL'S SWALLOWING AFTER CARDIAC SURGERY

Impacto da intubação orotraqueal na deglutição do indivíduo pós-acidente vascular encefálico após cirurgia cardíaca

Tatiana Magalhães de Almeida ⁽¹⁾, Paula Cristina Cola ⁽²⁾, Daniel Magnoni ⁽³⁾,
João Ítalo Dias França ⁽⁴⁾, Michele FCA Germini ⁽⁵⁾, Roberta Gonçalves da Silva ⁽⁶⁾

ABSTRACT

Purpose: to associate the degree of oropharyngeal dysphagia and orotracheal intubation time in post stroke individuals after cardiac surgery. **Methods:** a cross-sectional retrospective descriptive clinical study carried out by means of protocols data collection and chart records during six months in a public hospital of reference in cardiology. We analyzed 25 protocols and medical records of individuals undergoing cardiac surgery who evolved with stroke and were assisted by a team of speech language therapists. The subjects were divided into two groups. Group 1 (G1) consisted of 10 individuals with orotracheal intubation less than 24 hours and Group 2 (GII) of 15 individuals with orotracheal intubation more than 24 hours. After performing swallowing clinical evaluation and analyzing the association between the clinical classification of degree of commitment for dysphagia and orotracheal intubation time. **Results:** it was found that 40% of the individuals in group 1 presented mild dysphagia, 30% moderate and 20% severe. In Group II, 13.3% presented mild dysphagia, 33.3% moderate and 53.33% severe. There was a significant linear association between the degree of dysphagia and OTI. ($p=0,031$) indicating that the number of individuals with moderate and severe dysphagia was higher in the group with a longer intubation **Conclusions:** we could observe that time of orotracheal intubation more than 24 hours increases the degree of oropharyngeal dysphagia in this population.

KEYWORDS: Deglutition Disorders ; Stroke; Thoracic Surgery

⁽¹⁾ Seção de Fonoaudiologia do Instituto Dante Pazzanese de Cardiologia, São Paulo, SP, Brasil.

⁽²⁾ Faculdade de Medicina na Universidade de Marília UNI-MAR-Marília, SP, Brasil.

⁽³⁾ Setor de Nutrologia e Fonoaudiologia do Instituto Dante Pazzanese de Cardiologia IDPC- São Paulo, SP, Brasil.

⁽⁴⁾ Laboratório de Epidemiologia e Estatística (LEE) do Instituto Dante Pazzanese de Cardiologia IDPC São Paulo, SP, Brasil.

⁽⁵⁾ Instituto Dante Pazzanese de Cardiologia, São Paulo, SP, Brasil.

⁽⁶⁾ Departamento de Fonoaudiologia e do Programa de Pós-Graduação em Fonoaudiologia da Faculdade de Filosofia e Ciências da Universidade Estadual Paulista Júlio de Mesquita Filho-FFC/UNESP-Marília, SP, Brasil.

Conflict of interest: non-existent

■ INTRODUCTION

Cardiovascular disease (CVD) is considered to be the most frequent cause of death worldwide and according to the projections for 2020, will remain as the main cause ¹. The improvement of operative techniques allowed the reduction in the rate of mortality and morbidity, however, neurological complications in intra and postoperative remain being a common problem ^{2,3}. The most common neurological deficit is stroke ⁴ and represents the second most frequent cause of perioperative mortality⁵. The causes of stroke in the peri and postoperative periods are multiple. Among these

are the use of extra corporeal circulation (ECC) ^{2,4}, atrial fibrillation (AF) ^{6,7}, presence of atherosclerosis in the aorta and carotid arteries ², old age ^{2,4,6}, global or local hypoperfusion or haematological alterations, microembolization in intraoperative ², prolonged clamping time ⁵. The risk of developing stroke also increases the associated risk factors such as obesity, smoking, dyslipidemia, hypertension and diabetes mellitus ^{1,8}.

Stroke can bring numerous sequels, including oropharyngeal dysphagia, ⁹ swallowing disorder which can lead to aspiration pneumonia, dehydration, malnutrition and death ¹⁰.

However, in the population who underwent cardiac surgery, neurological injury cannot be considered isolated factor of cause for dysphagia, since these individuals can present intraoperative complications as important reduction of lung volumes, losses on respiratory mechanics, decrease in pulmonary compliance and increased respiratory work and require an extended period of mechanical ventilation, evolving in some cases for tracheostomy for difficult weaning ¹¹. Orotracheal intubation (OTI), defined as a prolonged period of more than 24 hours of intubation may impact directly the swallowing dynamics increasing the risk of laringotracheal aspiration ¹².

Considering that the population who underwent cardiac surgery evolving with stroke presents besides the neurological damage other predictive factors for oropharyngeal dysphagia. This study aimed to associate the degree of oropharyngeal dysphagia and oro-tracheal intubation in a post-stroke individual after cardiac surgery.

■ METHODS

This study was approved by the ethics and research committee of the institution (protocol #4129). This is a cross-sectional retrospective observational descriptive clinical study accomplished through data collection from assessment protocols and medical record evolution at institute of cardiology of the state of São Paulo, Brazil. The medical records of all individuals who have undergone cardiac surgery and evolved with postoperative stroke, within six months, between 2010 and 2011, and were assisted by a speech-language pathology team specialized in dysphagia after medical request were analyzed. We analyzed the medical records of all the individuals who have undergone cardiac surgery and evolved with postoperative stroke, within six months, between 2010 and 2011, and were assisted by a speech-language pathology team specialized in dysphagia after medical request.

The time of speech assessment after neurological damage ranged from 1 to 67 days.

The subjects were divided into two groups. Group 1 (GI) consisted of individuals with OTI time less than 24 hours (n=10) and group 2 (GII) individuals with OTI time more than 24 hours (n=15). Collection of the information in the database was performed by the researchers. For the clinical speech therapy assessment protocol data was collected with clinical classification of oropharyngeal dysphagia commitment proposed by Silva ¹³, applied during the acute phase of stroke. For the clinical classification of dysphagia framework it was considered mild dysphagia when there was the presence of records of labial sphincter alterations, lack of tongue coordination, language delay to trigger the pharyngeal response, absence of cough, absence of sharp reduction of the elevation of the larynx, absence of alteration of the vocal quality after swallowing and cervical auscultation without alteration. For the classification of moderate dysphagia we considered labial alteration, lack of tongue coordination, pharyngeal response delay, absence of cough or cough presence before, during or after swallowing. Severe dysphagia was classified in the presence of delay or absence of pharyngeal response, reduction in the elevation of the larynx, absence of cough, presence of cough before, during or after swallowing, change in vocal quality after swallowing, evident respiratory alteration, incomplete swallowing and altered cervical auscultation.

Categorical variables were described by absolute frequency and relative frequency. Chi-square test and linear association test were used for statistical analysis.

The statistical significance adopted was 5%.

■ RESULTS

We analyzed 25 charts, 56% males and 44% female gender aged 44 to 80 years, with a median of 62 years. Of these 14 subjects had coronary artery disease (CAD) and were submitted to myocardial revascularization surgery, 9 individuals submitted to valvular surgery, one individual was submitted to myocardial revascularization and valve replacement in the same surgical procedure and only one subject was submitted to endarterectomy. All individuals featured at least one of the personal history of risk such as: diabetes mellitus, obesity, smoking or atrial fibrillation. The ones with a previous history of stroke were excluded. All the strokes were ischemic and located in cortical region. In the period investigated, of the 25 individuals who have evolved with stroke evaluated in the acute phase, 24 individuals

(96%) presented oropharyngeal dysphagia and 1 individual (4%) did not present it.

In the analysis of the groups we observed a higher number of patients with mild dysphagia in Group I (40%) followed by moderate (30%) and severe (20%). The only patient of this study with functional swallowing belonged to Group I. A higher number of individuals in Group II presented severe oropharyngeal dysphagia (53.33%), followed by moderate (33.33%) and mild (13.33%).

Analysing the association between the groups GI and GII and the degree of oropharyngeal dysphagia, no statistical significance was found ($p=0.164$). But when analyzing the linear association a significant value of ($p=0.031$), was found, indicating that the number of individuals with moderate and severe dysphagia was higher in the group with a longer intubation. (Graphical 1).

Table 1- Linear association between GI and GII with the degree of oropharyngeal dysphagia

	Functional Swallowing	Mild Dysphagia	Moderate Dysphagia	Severe Dysphagia
Group I	10%	40%	30%	20%
Group II	---	13,33%	33,33%	53,33%

Statistical Test: linear association ($p=0,031$)

■ DISCUSSION

The population who underwent cardiac surgery and evolved with stroke features numerous risk factors for the development of oropharyngeal dysphagia, besides neurological injury. Therefore it is extremely important the integration of teams in the screening and diagnosis of dysphagia symptoms in this population.

As for the impact of OTI on this population's swallowing it was found that the group submitted to the prolonged OTI showed higher frequency of severe oropharyngeal dysphagia. It is known that OTI causes alterations in oral and pharyngeal phase of swallowing with tracheal aspiration risks and which may be an independent predictor of oropharyngeal dysphagia after extubation ¹².

In the current study it was possible to observe that the only patient with functional swallowing belonged to the group of patients with OTI less than 24 hours and that in this group there was a higher frequency of patients with mild dysphagia. Whereas in the group of patients with OTI more than 24 hours there was a higher number of patients with severe oropharyngeal dysphagia, followed by moderate dysphagia.

Linear association was found when analyzing the degree of dysphagia of group 1 in relation to group ii ($p=0.031$), thus, OTI for long periods was an aggravation for dysphagia in the present study, as reported by other authors who observed that the patients with neurological injury that showed worse deficits in swallowing were those who

were previously submitted to a longer period of mechanical ventilation ¹².

Another relevant fact is that 96% of individuals of the entire sample had oropharyngeal dysphagia. Although the occurrence of dysphagia in post-stroke population is quite variable in literature ¹⁴⁻¹⁷. Little do we know about dysphagia in individuals with stroke after cardiac surgery. The wide range of variation on the occurrence of dysphagia in individuals with stroke must be analyzed considering the methodological differences proposed in the investigations, the number of individuals, the site of the injury, the time of assessment in relation to the ictus, among other differences ¹⁷.

As regards the classification of oropharyngeal dysphagia impairment degree found in our sample, it was observed that this degree ranged from mild to severe, with higher frequency of severe dysphagia. Severe dysphagia are described in the literature as those which in addition to altering the swallowing oral phase provoke laryngotracheal aspiration ¹⁸. However, although there are disagreements among authors about what would be the ideal parameters for classifying as severe dysphagia, concordance point to the entry of food in lower airway, and in the case of the population studied, this can occur due to a number of predictive factors found in neurological and cardiac population ¹⁸.

Therefore, there is a possibility that the prolonged time of orotracheal intubation is also the cause of high prevalence and severity of oropharyngeal dysphagia in an individual who evolved with stroke after cardiac surgery.

Considering the limitations of our study, size of the sample and the absence of an objective research swallowing method that could measure the accuracy of dysphagia impairment degree used here it is necessary to continue in this line of research.

Due to the numerous predictive factors of dysphagia which this population presents, the specialized speech therapist activities with oropharyngeal dysphagia should be included within the specific intervention of tertiary cardiovascular prevention since dysphagia is a limiting consequence and the presence of a professional specialized in dysphagia is essential for early

diagnosis and proper treatment, possibly reducing the risks of complications, mainly respiratory ones.

In this way, it is apparent the need for teams to use screening tools that can map this population and forward early diagnosis and the rehabilitation of oropharyngeal dysphagia.

■ CONCLUSION

It was observed that prolonged oro-tracheal intubation interfered on swallowing dynamics, specifically on the degree of oropharyngeal dysphagia in this population.

RESUMO

Objetivo: associar o grau de disfagia orofaríngea e o tempo de intubação oro-traqueal no indivíduo pós-acidente vascular encefálico após cirurgia cardíaca. **Métodos:** estudo clínico transversal descritivo, retrospectivo, realizado por meio da coleta de dados de protocolos e registros de prontuário, durante seis meses, em Hospital Público de Referência em Cardiologia. Foram analisados 25 protocolos e prontuários de indivíduos submetidos à cirurgia cardíaca, que evoluíram com acidente vascular encefálico e foram assistidos pela equipe de Fonoaudiologia. Os indivíduos foram divididos em dois grupos. O Grupo I (GI) constou de 10 indivíduos com intubação oro-traqueal menor que 24 horas e o Grupo II (GII) de 15 indivíduos com intubação oro-traqueal maior que 24 horas. Realizada avaliação clínica da deglutição e analisada a associação entre a classificação clínica do grau de comprometimento para disfagia e o tempo de intubação oro-traqueal. **Resultados:** verificou-se que no GI 40% apresentaram disfagia leve, 30% moderada e 20% grave. No GII 13,3% apresentaram disfagia leve, 33,3% moderada e 53,33% grave. Verificou-se associação linear significativa entre o grau de disfagia e o tempo de IOT ($p= 0,031$), indicando que o número de indivíduos com disfagia moderada e grave foi maior no grupo com mais tempo de intubação. **Conclusões:** constatou-se que o tempo de intubação oro-traqueal maior que 24 horas aumentou o grau da disfagia orofaríngea nesta população.

DESCRIPTORIOS: Transtornos de Deglutição; Acidente Vascular Cerebral; Cirurgia Torácica

■ REFERENCES

1. Murray CJL, Lopes AD. The Global Burden of disease. A comprehensive assessment of mortality and disability from disease, injuries and risk factors in 1990 and projected to 2020. USA: Harvard School of Health; 1996.
2. Lelis RGB, Auler JOC. Lesão neurológica em cirurgia cardíaca: Aspectos Fisiopatológicos. Rev Bras Anestesiologia. 2004;54(4):607-17.
3. Dantas MORL. Disfagia em cardiopatas idosos: teste combinado de deglutição e monitorização dos sinais vitais. [Tese]. São Paulo: Faculdade de Medicina, Universidade de São Paulo; 2008.
4. Guaragna JCV, Bolsi DC, Jaeger CP, Melchior R, Petracco JB, Facchi LM, Albuquerque LC. Preditores de disfunção neurológica maior após cirurgia de revascularização miocárdica isolada. Rev Bras Cir Cardiovasc. 2006;21(2):173-9.
5. Maurmo AGP. Acidente Vascular encefálico no pós-operatório imediato de cirurgia cardíaca. In: Piegas LS, Armaganijan D, Timerman A. Condutas Terapêuticas do Instituto Dante Pazzanese de Cardiologia. São Paulo: Ed Atheneu; 2006. P.355-9.
6. Chaves MLF. Acidente vascular encefálico: conceituação e fatores de risco. Rev Bras Hipertens. 2000;4:372-82.
7. Wolf PA, Abbot RD, Kannel WB. Atrial Fibrillation: a major contributor to stroke in elderly. The Framingham Study. Arch Intern Med. 1987;147:1561-4.

8. O' Donnell MJ, Xavier D, Liu L, Zhang H, Chin SL, Rao-Melacini P, et al. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study *Lancet*. 2010;376(9735):112-23.
9. Okubo PCMI, Fábio SRC, Domenis DR, Takayanagui OM. Using the national institute of health stroke scale to predict dysphagia in acute ischemic stroke. *Cerebrovasc Dis*. 2012;33:501-7.
10. Furia CLB. Disfagias Mecânicas. In: Ferreira LP, Befi-Lopes DM, Limongi SCO. Tratado de Fonoaudiologia. Roca: São Paulo; 2004. P.386-404.
11. Guizilini S, Gomes WJ, Faresin SM, Bolzan DW, Alves FA, Catani R, Buffolo E. Avaliação da função pulmonar em pacientes submetidos à cirurgia de revascularização do miocárdio com e sem circulação extracorpórea. *Braz. J. Cardiovasc. Surg*. 2005;20(3):310-6.
12. Barker J, Martino R, Reichardt B, Hickey EJ, Ralph- Edwards A. Incidence and impact of dysphagia in patients receiving prolonged endotracheal intubation after cardiac surgery. *Can J Surg*. 2009;52(2):119-24.
13. Silva RG, Vieira MM. Disfagia orofaríngea neurogênica em adultos pós-acidente vascular encefálico: identificação e classificação. In: Macedo Filho E, Pisani JC, Carneiro J, Gomes G. Disfagia: abordagem multidisciplinar. São Paulo: Frôntis Editorial; 1999. P29-46.
14. Smithard DG, O'Neill PA, England RE, Park CL, Wyatt R, Martin DF, et al. The natural history of dysphagia following a stroke. *Dysphagia*. 1997;12:188-94.
15. Crary MA, Humphrey JM, Carnaby-mann G, Sambandam R, Mieler L, Silliman Dysphagia, Nutrition, and Hydration in Ischemic Stroke Patients at Admission and Discharge from Acute Care. *Dysphagia*. 2013;28(1):69-76.
16. Baroni AFFB, Fabio SRC, Dantas RO. Fatores de risco para disfunção da deglutição em pacientes com acidente vascular encefálico. *Arq. Gastroenterol*. 2012;49(2):118-24.
17. Schelp AC, Cola PC, Gatto AR, Silva RG, Carvalho L R. Incidência de disfagia orofaríngea após acidente vascular encefálico em hospital público de referência. *Arq. Neuro-Psiquiatr*. 2004;62(2-B):503-6.
18. Silva RG, Motonaga SM, Cola PC, Gatto AR, Watson PR, Carvalho LR et al. Estudo multicêntrico sobre escalas para grau de comprometimento em disfagia orofaríngea neurogênica. *Rev. Soc.Bras. Fonoaudiol*. 2012;17(2):167-70.

Received on: February 24, 2014

Accepted on: August 23, 2014

Mailing address:

Tatiana Magalhães de Almeida
Instituto Dante Pazzanese de Cardiologia –
Fundação Adib Jatene
Avenida Dr. Dante Pazzanese, 500 – Vila Mariana
São Paulo – SP – Brasil
CEP: 04012-909
E-mail: tatiana.almeida@dantepazzanese.org.br