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Management of emergency situations in patients undergoing tracheostomy

Gerenciamento de situações de emergência em pacientes traqueostomizados

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ABSTRACT

Objectives: The aim of this study was to evaluate the level of knowledge of health care professionals in an emergency situation related to tracheostomy tube displacement

Methods: a descriptive and exploratory study was carried out with the intensive care unit health professionals of a university hospital in Salvador, Brazil, from July to September 2007. For this purpose, a questionnaire was translated and adapted from a previous study. Questions were: 1- Have you dealt with this emergency? 2 - What is the first thing you do? 3- Do you know what the stay sutures are for? 4 - How are they used in an emergency setting? 5 -Do you know what to do with the introducer?

Results: the sample comprised 41 professionals (nine physicians, 20 nurses and 12 physiotherapists). A descriptive analysis showed that 63% of professionals had never experienced such complications. Analysis of a subgroup showed that 42% of physiotherapists, 56% of physicians and 69% of nurses would act inappropriately. Analyzing the level of knowledge about the importance of stay sutures, the study showed that 78% of the sample did not know what they were or how to use them, and 63.4% did not know how to use the introducer correctly.

Conclusions:, regarding the use of a tracheostomy tube in a situation of emergency, the level of knowledge of the professionals evaluated was insufficient. The greatest shortcoming was detected in the level of knowledge about stay sutures.

Keywords: Emergencies; Intensive care; Tracheostomy/methods; Intubation, intratracheal/methods

INTRODUCTION

Tracheotomy is one of the surgical procedures most often performed in the intensive care unit (ICU).[1] Decision of the adequate moment to perform tracheostomy is not well defined. However, it has to be adjusted for each patient considering base pathology, recovery expectations, deleterious effects of prolonged orotracheal intubation and risk of a surgical procedure.[2] Other indications for tracheostomy include: extubation failure, upper airways obstruction and constant need of bronchial toilet.[3]

Currently, rates of complication incidence are relatively low (2.7-4.3%)[4-6] and seldom lead to death of patients. Nevertheless, in cases

of accidental displacement of the tube at the early post-surgery stage (incidence of 0.8 – 1.5% of all complications)[7] mortality rate may reach 100%.[8]

Tracheotomy can basically be carried out by two approaches, percutaneous or open surgery. The percutaneous was reintroduced with the Ciaglia, technique in 1985,[9] and became very popular in the nineties.[10]

For the open surgical approach, there are various techniques, however stay sutures are always recommended. Two circumferential sutures are made surrounding the lateral side of the approached ring and are secured on the patient's chest for the purpose of causing traction on the trachea and facilitating passage of the tube into the lumen.[11] When inserting the tube, the opening must be filled by the obturator, a device functioning as a guide for passage with lesser risk of opening a false track.[3]

After open surgery, as the tract remains unstable for 3 to 5 days an effort to replace the tube at this time is usually frustrated endangering the patient.[3] Multiple factors including obesity, short neck, anatomic anomalies, and abundant secretion in the respiratory tract and excessive amount of granulation tissue may even complicate replacement in a stable airway.[12]

In the hospital setting, many health care professionals are directly involved in the management of tracheostomized patients. As such, the main objective of this study was to assess the level of knowledge of the multidisciplinary team in an emergency situation related to exposure of the tracheostomy tube in the early stage of open surgery. The secondary objective was to identify possible key areas where inadequate maneuvers are being performed.

METHODS

A descriptive exploratory study was carried out to establish the level of knowledge of health care professionals (physicians, physiotherapists and nurses) regarding management of tracheotomy in an emergency situation. A representative sample of professionals stationed in the intensive care unit of a university hospital in Salvador-BA was interviewed. This unit is classified as a general ICU with clinical as well as surgical patients. Sample size (41 interviewed) was established based upon the calculation of the sample Z for nominal or ordinal variables and finite population (59 professionals) where $n = z^2.p.q.N/d^2 [d^2 (N-1) + z^2.p.q]$.[13] Data collection was carried out from July to September of 2007, by a single interviewer, duly trained and acquainted with the proposed subject.

For data collection a semi-structured questionnaire , translated and adapted from a former study was used.[3] Variables in the questionnaire were profession, level of specialization, time of experience, and a short clinical case, illustrating an emergency situation followed by five questions (Appendix 1). Data analysis was carried out with the SPSS 15.0 program in a descriptive manner for the purpose of verifying the level of knowledge of the surveyed sample.

At the time of interview the objective of the survey was emphasized and a term of informed consent was signed assuring anonymity, confidentiality of data and the right to interrupt the interview at any time. The questionnaire was completed in the presence of the examiner immediately after signing the term of consent.

RESULTS

The sample comprised 41 professionals (nine physicians, 20 nurses and 12 physiotherapists). Most professionals (56%) had some specialization, 26.8% were residents and only one had a master's degree. Regarding time of graduation, 65.9% had less than four years of experience.

When queried if they had already experienced some emergency situation involving displacement of the tracheostomy tube at an early stage of surgery, 63.4% of professionals replied that they had never experienced this complication.

For 29.2% of the sample, the first action to be taken in management of tracheostomy in an emergency situation was to ventilate the patient with a manual resuscitator and orofacial mask until the moment for orotracheal intubation. Most interviewees, 56% of the sample, selected immediate re-introduction of the tracheostomy tube (Figure 1). Regarding the stay sutures, 78% of the interviewees stated that they did not to know what they were and how to use them. For 63.4% 0f those interviewed, the correct way of utilizing the obturator was not known. Overall analysis of all professionals disclosed that 58.5% acted improperly in the emergency situation involving tracheotomy.

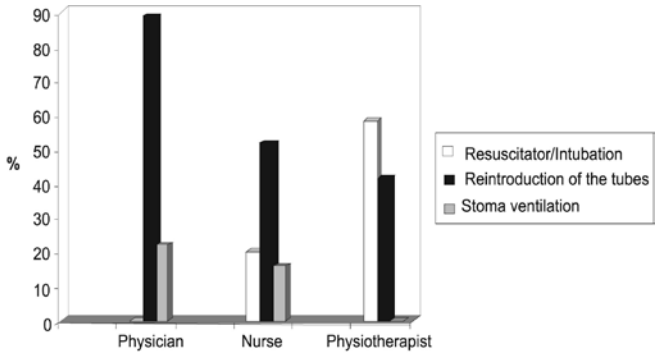

Figure 1 – Which would be the first thing you would do to reestablish patient ventilation?

DISCUSSION

A shortcoming in the level of knowledge of health care professionals in relation to management of tracheostomy in a situation of total exteriorization of the tube at the early stage of surgery became evident.

O displacement of the tube may take place at any time, regardless of the surgical technique[12] and although the incidence is low (0.8-1.5%), it is associate with high mortality rates.[8,14] This survey disclosed a high prevalence of professionals who have experienced this situation, 36.6 %, which contrasts with the mere 18.5% found in other studies.[3]

In cases of accidental displacement of the tube at the early stage of tracheotomy the safest conduct is to set up orofacial ventilation with manual resuscitator and perform a translaryngeal intubation before reintroducing the tube in the stoma.[3,14] In this study only 29.2% of the professionals chose this alternative, while in a former survey,[3] a 37% was found This higher value that had been presented may be related to inclusion of head and neck surgeries in the sample, which attained higher rates of correct replies, raising the overall percentage.

Reintroduction of the tube is only feasible if the professional knows how to use stay sutures and has an obturator available at the time of reintroduction. However, even with all these resources, chances of this procedure being successful are poor.[3,15,16] Of the twenty three interviewees (56%) who chose reintroduction of the tube, 18 professionals (78.3%) did not know how to use stay sutures and or the obturator.

The obturator is a guide which adapts and adjusts the tracheostomy tube for appropriate reintroduction in the stoma. Its rounded tip permits repositioning of the tube, reducing the probability of generating a false track and injury to the structures involved in the surgery.[3,15]

The stay sutures directly placed on both sides of the tracheal wall may facilitate repositioning of the tracheostomy tube. Exerting an upward and sideway traction the sutures bring the tracheal orifice to the surface, minimizing possible false tracks and hemorrhages related to repositioning of the tracheostomy tube. However, if crossed or tangled, stay sutures may narrow the stoma producing obstruction.[11,14,16]

Deficient level of knowledge of professionals regarding emergency procedures involving tracheotomy was common in all surveys found on the subject. In a study published in 2004,[17] health care professionals were assessed in a ventilatory emergency with tracheostomized patients. This survey interviewed approximately 885 professionals, physicians and nurses with a method similar to this study. It was shown that less than 50% of the interviewees were able to correctly complete the questionnaire, which substantiates the current survey where only 41.5% of professionals responded correctly.

The main limitation of this survey is related to the structure of the questionnaire used, which could cover more variables, However, this was chosen because it had been previously published.[3] This does not invalidate current results, as it was possible to objectively examine the level of knowledge of the interviewed professionals. To our knowledge this is the first work in Brazil, to verify the level of understanding of ICU professionals about management of tracheotomy in an emergency situation.

CONCLUSION

The level of knowledge of professionals regarding management of tracheotomy in an emergency situation was insufficient. Therefore, there is a need to focus training of the multidisciplinary team on this subject to foster adequate procedures in such a risk of life situation. Key areas in which there was inadequate management were indirectly related to the basic understanding about this surgical technique and its peculiarities such as: time of tract formation and stay sutures. Another major shortcoming was related to understanding of the obturator‘s function. Comprehension of the concept of these structures and peculiarities of the surgical technique is fundamental to reduce the high mortality rates.

RESUMO

Objetivos: O objetivo principal deste estudo foi avaliar o nível de conhecimento dos profissionais de saúde com relação ao gerenciamento de uma situação de emergência envolvendo deslocamento acidental da cânula de traqueostomia.

Métodos: Foi realizado um estudo descritivo exploratório com profissionais de saúde (médicos, fisioterapeutas e enfermeiros) da unidade de terapia intensiva de um hospital universitário, em Salvador-BA, no período de julho a setembro de 2007. Para tanto, foi traduzido e adaptado um questionário semi-estruturado retirado de um estudo prévio. As perguntas foram: 1- você já lidou com esta situação? 2- Qual seria a sua primeira conduta? 3 - Você sabe o que são as suturas de ancoragem? 4 - Como as suturas de ancoragem devem ser utilizadas em uma emergência? 5 - Você sabe o que é e como deve ser utilizado o obturador?

Resultados: A amostra foi composta por 41 profissionais (nove médicos, 20 enfermeiros e 12 fisioterapeutas). A análise descritiva demonstrou que 63% dos profissionais nunca vivenciaram esta intercorrência. Uma análise dos subgrupos evidenciou que 42% dos fisioterapeutas, 56% dos médicos e 69% dos enfermeiros agiriam de forma inadequada nesta situação. Uma análise global, com relação ao nível de conhecimento sobre as suturas de ancoragem, demonstrou que 78% dos entrevistados não sabiam o que eram e como utilizá-las, assim como 63,4% afirmaram desconhecer a forma correta de utilização do obturador.

Conclusões: O nível de conhecimento dos profissionais avaliados, referente ao manejo da traqueostomia em uma situação de emergência, foi insuficiente. Uma maior deficiência foi detectada com relação ao conhecimento e a utilização das suturas de ancoragem.

Descritores: Emergências; Cuidados intensivos; Traqueostomia/métodos; Intubação intratraqueal/métodos

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Appendix 1 – Model of the questionnaire used for data collection

QUESTIONNAIRE

Profession: ☐ Physician ☐ Physiotherapist ☐ Nurse

Experience: ☐ Up to 4 years ☐ > 4 years

Specialization: ☐ Resident ☐ Assistant ☐ Specialist ☐ Master ☐ Ph.D.

Clinical Case:
Patient admitted to the ICU on the second postoperative day, after tracheotomy, because of prolonged mechanical ventilation due to brain injury. Patient presenting with acute lung injury requiring a FiO2 > 60% PEEP > 10 cmH2O and Glasgow of 6. An effective cough caused displacement with total exteriorization of the tracheotomy tube.

1 - Have you ever dealt with some situation of exteriorization of the tracheotomy tube at early postoperative?
☐ Yes ☐ No

2 - What would be the first thing you would do in this situation?
☐ Ventilate with manual resuscitator and or facial mask until the time to intubation.
☐ Immediately replace the tracheostomy tube
☐ Ventilate the surgical route with the manual resuscitator

3 - Do you know what stay sutures are?
☐ Yes ☐ No

4 - How should stay sutures be used in an emergency?

5 - Do you know what an Introducer/Obturator is and how it should be used?