Bougie *

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RESUMO

Reis LA, Reis GFF, Oliveira MRM, Ingarano LEB - Bougie.

JUSTIFICATIVA E OBJETIVOS*: As situações de via aérea difícil expõem o anestesiologista à necessidade de rápida atuação, muitas vezes necessitando de dispositivos complementares para garantir a permeabilidade destas vias. Porém muitos destes dispositivos são dispendiosos e necessitam treinamento para seu emprego. É apresentado aqui dispositivo simples, descartável e que pode ser confeccionado pelo próprio anestesiologista, tornando-o ferramenta de baixo custo: o bougie.*

CONTEÚDO*: O bougie consiste de introdutor que, inserido na traquéia, ajuda a orientar a introdução da cânula traqueal. Por ser ferramenta simples, de fácil manipulação e de baixo custo, mostra-se extremamente útil nas situações de via aérea difícil inesperada.*

CONCLUSÕES*: O bougie mostrou-se uma valiosa ferramenta no arsenal anestesiológico, estando bem indicado num amplo espectro de situações.*

Unitermos: ANESTESIA, Geral; INTUBAÇÃO, Traqueal.

SUMMARY

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BACKGROUND AND OBJECTIVES: *Difficult airways require fast action by the anesthesiologist often requiring complementary devices to ensure patent airways. However, several of those devices are expensive and require training in order to be used. The bougie, a simple and disposable device can also be manufactured by the anesthesiologist, making it a low cost tool.*

CONTENTS: *Bougies are composed of one introducer that when inserted in the trachea helps orienting the introduction of the tracheal tube. It is a simple tool, easy to use, low in cost, and has been shown to be very useful in unexpected difficult airways.*

CONCLUSIONS: *The bougie has shown to be a valuable tool in the armamentarium of the anesthesiologist, and it is indicated in a wide range of situations.*

Keywords: ANESTHESIA, General; INTUBATION, Tracheal.

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INTRODUCTION

The bougie, also known as Frova or Gum Elastic Bougie, consists of an auxiliary, introducer-type device for tracheal intubation widely used in Europe because it is inexpensive, simple, easy to use[1], and very versatile. It can be used in different situation and will be presented here. It is an invaluable tool in the unexpected difficult airway, and the first choice of anesthesiologists in the United Kingdom[2,3]. Currently, several guidelines for the airways suggest their use[4-6]. In English, the word bougie means candle, a device used to dilate structures, which does not correspond to the use of this tool; besides, the material is not elastic as suggested by the term elastic, and it is not made of resins as suggested by the term gum[7].

The first bougie used as a tracheal intubation aid was described by Macintosh in 1949[8] by using a urethral dilation catheter[9] and since then it has been used for several purposes. In 1970, the introducer was modified by Venn[7], with an angulation between 35° and 40° of the distal end (a shape known as *coudé*) [9,10] creating the characteristic shape still in use nowadays.

Currently, several types of introducers are called bougie including the disposable (single use), reusable (multiple use), and homemade. Reusable bougies are made of a more flexible material, have a globose and round tip, and can be used up to five times[10,11]. The disposable bougie is made of a more rigid material with a straight tip, and it has a central channel that can be used for aspiration or to administer oxygen. The homemade introducer can be made using a 60-cm piece of a cord introducer, which is found in hardware stores very similar to an electrical cord but without the metal inside. It is made of nylon, it can be cut and its extremity can be sanded to make it less traumatizing.

To use the handmade or the reusable device, it is important to follow disinfecting standards. The material should be washed in a solution of water and neutral soap to remove all residues, including secretions and blood. Afterwards, it should be submerged in a disinfecting solution and sent for sterilization. The device should be stored in the original wrapping and protected from light. Cupitt demonstrated a significant incidence in the contamination of bougies that are not properly stored[10].

USES AND TECHNIQUES

Multiple uses of the bougie have been described in the lite-

rature; among them we should mention intubation of the unexpected difficult airway[12-14], change of tracheal tubes, guiding rigid bronchoscopes[15], and the insertion of double-lumen tracheal tubes[16-17] and laryngeal masks[18,19]. It is not as effective as the fiberscope in the intubation of patients with known difficult airways[2]. In unexpected difficult airways, it is superior to the lighted stylet[3] since it is easier to manipulate and it does not require extensive training[20] despite being associated with a higher incidence of failed intubation[2]. Hammarskjöld[21] described in 1999 the introduction of a see-through-bougie-guided fiberoptic bronchoscope. Once inside the trachea, the fiberoptic bronchoscope was removed and the introducer remained inside the trachea to guide the introduction of a tracheal tube.

In unexpected difficult airways in patients Cormack 2 to 4, the bougie can be introduced directly into the trachea under laryngoscopy. If the vocal cords are not visible and the epiglottis is partially visible, it can be used to locate the tracheal opening below the epiglottis. After placing it inside the trachea, it should be introduced gently to avoid traumatism until impacting in the airways. When introducing it in the trachea, the anesthesiologist should feel the characteristic clicks caused by sliding its extremity over the tracheal rings. If those clicks are not felt, it should be considered the possibility of esophageal insertion[22]. Once in the trachea, laryngoscopy is maintained and, if possible, with the help of an assistant, the tracheal tube should be introduced through the bougie using a 90° anti-clockwise rotation to prevent its beveled point from getting caught in the arythenoids[23], and then remove the bougie. Weisenberg[13] described the use of a mirror placed in the larynx to help visualize the introduction of the device. The author observed a lower incidence of failure when using indirect laryngoscopy.

A consensus among anesthesiologists on the best way to hold the bougie does not exist. Hodzovic[24] compared the easiness to introduce the device when it was held at 20 and 30 cm from the extremity, and concluded that holding it at 20 cm allowed greater control and faster introduction, but the pressure on the walls of the airways was considerably higher increasing the probability of injuries. A controversy on the compression of the cricoid cartilage also exists. This maneuver seems to facilitate the introduction of the device[24], but during progression of the tracheal tube the effect can be the opposite.

The bougie can be used to change the tracheal tube although a version for this end called “tracheal tube exchanger” is available. In this case, the device is introduced through the tracheal tube to be changed, the old one is removed and with the help of laryngoscopy the new ET tube is introduced according to the technique described.

Several descriptions on the use of the bougie to help inserting the laryngeal mask can be found in the literature, being inserted through conventional masks or ProSealT mask. During a difficult intubation in which the bougie is suddenly introduced in the esophagus, it can be used to guide the introduction of the laryngeal mask[25]. Lopez-Gil[20] described the intentional introduction of the device in the esophagus under laryngoscopy to orient the introduction of the laryngeal mask. On this paper, it was not clear the advantage of laryngoscopy to introduce the bougie and then the laryngeal mask instead of tracheal intubation. The association of this device with the laryngeal mask is also described in the literature during intubation failures, when the anesthesiologist introduces the laryngeal mask to ventilate the patient and then uses it to introduce the bougie in the airways[19,26,27].

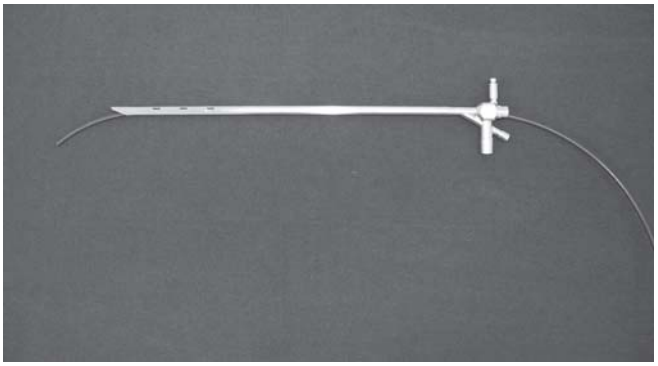

Figure 1 - Bougie Introduced through a Rigid Bronchoscope.

During rigid bronchoscopy, it is extremely difficult to introduce the bronchoscope in some patients. Multiple accesses to the airways might also be necessary due to several device changes, and tracheal dilation and intubation at the end of the procedure. Bleeding and edema hinder successive intubations. In those cases, the bogie has shown to be effective[15,16] (Figure 1).

COMPLICATIONS

Although it is widely used in Europe[1], few complications have been reported in the medical literature placing an apparent notion of safety. Complications can be divided into three groups: failure of the material, traumatic, and biological.

Among complications related to the material, bougie breakage with or without the loss of fragments in the airways have been reported. In 2002, Gardner[28] described the detachment of the tip of the bougie during intubation, which required bronchoscopy to remove the fragment from the airways. Similar cases were seen in 1999[11] and 1995[20], indicating the need to inspect the material especially of reusable bougies before their use. The reusable device should only be used five times due to parching of the material, leading to weakens and possible fracture of the device.

Among traumatic complications, severe bleeding in the airways[30,31] after the use of the bougie should be emphasized. However, the reports of pharyngeal perforation[32], esophageal lacerations, and pneumothorax[33,34] are more severe. During the manufacture of a homemade device, its extremity can be coarse and with projections, which are potential sources of

traumatism. Therefore, although it is a simple device, caution should be exerted when using it. Disposable bougies also seem to be potentially more traumatic[25] and less effective[35,36] than reusable devices because their tip is not rounded and exerts more pressure on the walls of the airways.
Transmission of diseases and infections has also been reported especially with reusable bougies indicating the need for adequate care during storage and disinfection[10].

CONCLUSION

The bougie is a cheap, easy to use, and successful device when used in unexpected difficult airways. This simple tool should be part of the basic anesthesiology armamentarium and be available in all operating rooms. In emergency situations, it has shown to be capable of helping fast intubation, guaranteeing opened airways, surpassing more sophisticated devices such as the lighted stylet and fiberoptic bronchoscope. However, in order to use it, the anesthesiologist should make sure it has been properly disinfected. It should be introduced gently to decrease the risks of breakage of the material or airways injury. It requires someone's help because the anesthesiologist should maintain laryngoscopy during the introduction of the bougie and ET tube.

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RESUMEN

Reis LA, Reis GFF, Oliveira MRM, Ingarano LEB - *Bougie*

JUSTIFICATIVA Y OBJETIVOS*: Las situaciones de vía aérea difícil obligan al anestesiólogo a actuar rápidamente, muchas veces necesitando dispositivos complementarios para garantizar la permeabilidad de esas vías. Sin embargo, muchos de esos dispositivos son caros y necesitan un entrenamiento para su uso. Aquí presentamos un dispositivo sencillo, desechable y que puede ser confeccionado por el mismo anestesiólogo, convirtiéndolo así en una herramienta de bajo coste: el bougie.*

CONTENIDO*: El bougie es un introductor que insertado en la tráquea, ayuda a orientar la inserción de la cánula traqueal. Por ser una herramienta muy sencilla, de fácil manejo y de bajo coste, es muy útil en las situaciones de vía aérea difícil inesperada.*

CONCLUSIONES*: El bougie fue una valiosa herramienta en el arsenal anestesiológico, siendo muy bien indicada en una amplia gama de situaciones.*