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Case Report

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Emergent Tracheostomy in Two Patients with Acute Leukemia: Comparing Surgical and Percutaneous Methods

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Tracheostomy is defined as opening a reliable conduit in front of the neck into trachea which provides breathing of the patient. Percutaneous Dilatational Tracheostomy (PDT) was first introduced in 1985 and then it was developed by invention of new devices. This method was allowed to be performed only for elective cases and it was contraindicated in emergent and hemorrhagic conditions until 2005. However, since 2006 so many cases of PDT have been performed in emergency situations and some reports show the superiority of it to surgical tracheostomy. In this report, two patients who had the same conditions underwent emergent tracheostomy via surgical and Griggs percutaneous methods and advantages of PDT during and after operation was described.

Key words: Percutaneous dilatational tracheostomy, leukemia, emergent

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INTRODUCTION

Non-surgical dilatational tracheostomy was first defined in Ciaglia *et al.* (1985). In this method and other similar methods, conduction is achieved via a wire and following the use of various dilators and forceps, tracheostomy tube is passed (Ciaglia *et al.*, 1985).

Griggs *et al.* (1991) used a special forceps named Griggs forceps for Percutaneous Dilatational Tracheostomy (PDT) which achieved to better results. There is no need for dilators in this method. Nowadays this method and other similar methods are routinely used in Intensive Care Units (ICUs) and patients take advantages of them (Crofts *et al.*, 1995). Until 2005, performing PDT was contraindicated in emergency situations, patients with previous neck surgery, neck infection, huge thyroid, acute coagulopathy and less than 18 years old (Fridman *et al.*, 1996). Other methods have also been introduced which require bronchoscopy and are more difficult to learn (Griggs *et al.*, 1991). PDT and surgical tracheostomy have been widely compared and their advantages have been reported (Walz *et al.*, 1998). Recently, emergent PDT has been preferred to surgical tracheostomy in various clinical trials (Klein *et al.*, 2004).

CASE 1

The patient was a 28 year-old woman with acute leukemia (AML, M4) receiving chemotherapy. She had swelling and edema of pharynx from one month ago which had gradually developed and despite antibiotic therapy she had dyspnea. Then she lost the ability of swallowing and was transferred to operative room because of upper airway obstruction. While entering the operative room, she had a platelet count of 36000 and a mild bleeding of her mouth. After performing monitored anesthetic care, she underwent Griggs PDT via the pass of a guidewire with a No. 7 tracheostomy tube through the 1st and 2nd intercartilage space. She had bleeding less than 1.5 cc during tracheostomy. She was monitored in ICU for 3 weeks. During the first week, despite a platelet count of 10000, the site of tracheostomy was clean and without any bleeding. During the second week, she once had a platelet count of 8000, however no bleeding in the site of tracheostomy was seen (Fig. 1) but bleeding of gums and mouth mucosa occurred. In the third week her clinical status worsened and from the 18th day she developed active hemorrhage and bleeding of lungs occurred.

Laboratory findings of hematologic system was impaired and platelet count had declined to less than 2000. During all this time, despite the active hemorrhage of



Fig. 1: Small size of incision, Tight site of tracheal tube without bleeding and secretion



Fig. 2: Active hemorrhage of mouth and gum without bleeding in the site of PDT

mouth mucosa and lung she had no secretion from the site of tracheostomy (Fig. 2). Finally she expired at the 21st day.

CASE 2

The patient was a 24 year-old woman with AML (M4) who was unable to speak because of severe swelling of submandibular area and tongue and had impaired breathing and prone to respiratory arrest. She



Fig.3: Bleeding was seen in the site of surgical tracheostomy

was immediately transferred to operative room and underwent surgical tracheostomy. In operative room she had a platelet count of 22000 that platelet and fresh frozen plasma was administered before entering operative room. During ICU stay her platelet count was low and despite treatment it was in the range of 2000-10000.

All the time that she was in ICU, bleeding of the tracheostomy site was observed and because of the larger size of incision of the surgery than that of PDT, the wound did not heal (Fig 3). She also expired at the 11th day.

DISCUSSION

Tracheostomy is an emergency procedure in patients with complete obstruction of upper airway in whom intubation is not possible. But tracheal intubation through mouth or nose can provide a certain airway in other cases. Most of specialists believe that for patients who need a long-term mechanical ventilation, use of tracheostomy is better than tracheal tube (Fridman and Mayer, 1993). All studies comparing surgical tracheostomy and PDT showed that amount of bleeding and rate of infection was less in the latter method.

Small incision of tissue, less dissection and injury to soft tissue and less complication in the surgical field are the advantages of PDT compared to surgical tracheostomy (Byham *et al.*, 2000; Heffner, 1993; Armstrong *et al.*, 1998; Brook and Malen, 2000; Stauffer *et al.*, 1981; Sugerman *et al.*, 1997; Lesnik *et al.*, 1992; Rodriguez *et al.*, 1990; Heffner and Zamora, 1990; Kollef *et al.*, 1999). Lack of need to bronchoscope during tracheostomy for confirming the correct position of tracheostomy tube and early wean from ventilator are

some of other important advantages of this method. As Griggs *et al.* (1991) did not report any case of significant tracheal stenosis in their method, subjects with symptomatic tracheal stenosis are rare during PDT (Callanan *et al.*, 1997).

Long-term complications and wound healing at the site of tracheostomy with Griggs method are significantly rare (Hill *et al.*, 1996; Toursarkissian *et al.*, 1994; Mathisen, 1990; Qureshi *et al.*, 2000). Griggs tracheostomy can be performed by skilled persons and the need for assistant, operating room and equipments are less in it than other methods (Rumbak *et al.*, 2004; Ahrens *et al.*, 2003; Fischler *et al.*, 1995). Until 2005, authors believed that PDT should not be performed in patients with previous neck surgery, huge thyroid, coagulopathy and emergency situations. But during recent years in performed clinical trials and meta-analysis superiority of PDT to surgical tracheostomy has been shown even in emergency situations because of its rapidity, short duration of mechanical ventilation, less ventilatory-associated pneumonia, lack of bleeding and less mortality (Van Heurn *et al.*, 1996; Jacson, 1999; Cheng and Fee, 2000). Authors have recommended early tracheostomy because of less injury to oral cavity and larynx, less unwarranted extubation and less mortality. Although Cumming's textbook of otolaryngology consider PDT as a contraindication in emergency situations and platelet count less than 40000 (Goldenberg and Bhauri, 2005), it can be performed in emergency situations as mentioned.

CONCLUSION

PDT is improving rapidly and it is the method of choice for tracheostomy in most ICUs, so new indications for PDT are being suggested from authors.

Although more studies are required to approve coagulopathy disorders and emergency situations as two new indication for PDT, we showed it can be done safe in patients with leukemia (coagulation disorders) and compromised airway (as an emergent method).

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