

## Early complications after tracheostomy

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### الخلاصة:

تعتبر عملية تفويه الرغامى من العمليات الآمنة ، ولكنها تحمل كأي عملية جراحية أخرى خطورة حصول المضاعفات.

الهدف من الدراسة: تقييم المضاعفات المبكرة الحاصلة بعد عمليات تفويه الرغامى التي أجريت في مستشفيات مجمع مدينة الطب في بغداد .

المرضى والطرق: دراسة منظورة ل (١٢٥) عملية تفويه رغامى متتابعة أجريت خلال فترة عام واحد من أيار ٢٠٠٦ وحتى أيار ٢٠٠٧ في مستشفيات مجمع مدينة الطب في بغداد

النتائج: ٣٣ مريضاً (٢٤,٤%) كانوا ذكورا. ٣٧ مريضاً (٢٩,٦%) من مرضى هذه الدراسة كانوا في العقد الثالث من العمر.

حصلت المضاعفات عند ٥٣ مريضاً (٤٢,٤%). ألتهاب الجرح الجرثومي كانت الأكثر شيوعا وحدثت في ٢٣ مريضاً (٤٣,٤%)، تبعها النفاخ تحت الجلد في ١٤ مريضاً (٢٦,٢%) والنزف في عشرة مرضى (٨,١%).

سجلت حالة وفاة واحدة متعلقة بعملية تفويه الرغامى (٠,٨%). معدل المضاعفات كان مرتفعا بصورة ملحوظة في حالة العمليات الطارئة (٥٠,٦%) عن ماهو عليه في العمليات الباردة (٢٦,١%) ، وفي العمليات التي أجريت تحت التخدير الموضعي (٤٨,٣%) مقارنة بتلك المجرأة تحت التخدير العام (٢٥%).

الاستنتاجات: أغلب المضاعفات المبكرة لعملية تفويه الرغامى كانت عائدة الى الطبيعة الطارئة للعملية والعناية التمريضية غير المناسبة بعد العملية. ألتهابات الجروح الجرثومية كانت هي الأكثر شيوعا بين هذه المضاعفات.

### Abstract

Having a tracheostomy is considered to be a safe and straightforward procedure, but as with many surgical procedures it does carry a risk of complications.

**Aim:** To evaluate tracheostomy early complications at Medical City Complex, Baghdad.

**Patients and methods:** A prospective study of (125) consecutive tracheostomies that were performed during one year period from May 2006 through May 2007 in Medical City, Baghdad.

**Results:** Ninety three patients (74.4%) were males. Thirty seven patients (29.6%) were in their third decade. Complications developed in fifty three patients (42.4%); wound infection was the commonest in twenty three patients (43.4%), followed by subcutaneous emphysema in fourteen patients (26.4%) and haemorrhage in ten patients (18.8%). One tracheostomy related death was encountered (0.8% of the total no. of patients). The complication rate was significantly higher in urgent tracheostomies (50.6%) than elective procedures (26.1%) and in those performed with local anaesthesia (48.3%) compared to (25%) under general anaesthesia.

### Conclusions:

Most of early complications were due to the urgency of the procedure and inadequate postoperative nursing care. Wound infection was the commonest complications.

**Key words:** Tracheostomy, urgent, early complications.

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**Introduction:**

Tracheostomy is relatively a safe procedure despite its complications<sup>1</sup> which are frequently resulted from improper execution of the procedure or inadequate postoperative care of tracheostomized patients. Moreover, emergency tracheostomy carries two to five folds increase in the incidence of complications over an elective procedure<sup>2</sup>. Complications of tracheostomy may be divided into immediate, that is during or immediately after operation; intermediate, happening during the rest of the patient's stay in the hospital; or late, occurring when the patients has gone home<sup>3</sup>, or considered as being *early* or *late*, the dividing line being about one week into the postoperative period.<sup>4</sup>

The goal of the present study is to analyze the early complications associated with tracheostomies carried out in Medical City Complex, Baghdad.

**Methods:**

A prospective study of (125) patients who underwent tracheostomy due to different reasons at hospitals of Medical City Complex; Baghdad, during one year period, from May 2006 through May 2007. Information concerning patient's age, gender, indications, timing of tracheostomy, site of the operation, type of the anesthesia, and the early complications were studied through review of charts. Tracheostomized patients referred from other hospitals were excluded from this study. All tracheostomies were performed conventionally. All patients followed in the early post operative days of their Hospital stays' for adverse events related to the tracheostomy.

**Results:**

One hundred and twenty five patients were included in this study with the mean age was 36.2 years. Most patients (52.8%) were between third and fourth decades of life and the majority (74.4%) was males, table (1).

**Table (1) Age & gender incidence**

<b>Variables</b>	<b>Patients, no., (%)</b>
<b>Age in years</b>	
<10	8(6.4)
10 – 19	6(4.8)
20 – 29	37(29.6)
30 – 39	29(23.2)
40 – 49	10(8)
50 – 59	11(8.8)
60 – 69	16(12.8)
≥70	8(6.4)
<b>Gender</b>	
Male	93(74.4)
Female	32(25.6)

The main indication of tracheostomy was upper airway obstruction in eighty four patients (67.2%), table (2).

**Table (2): Indications of tracheostomy**

<b>Indications</b>	<b>Patients, no., (%)</b>
Upper airway obstruction	84(67.2)
Assisted ventilation	22(17.6)
Tracheobronchial tree protection and toilet	19(15.2)

Eighty three patients (66.4%) underwent urgent tracheostomy, while tracheostomy was performed electively in forty two patients (33.6%), table (3).

**Table (3): Timing of tracheostomy**

<b>Timing of tracheostomy</b>	<b>Patients, no., (%)</b>
Urgent	83(66.4%)
Elective	42(33.6%)

In ninety three patients (74.4%) tracheostomy was done under local anesthesia, while general anesthesia had been used in thirty two patients (25.6%), table (4).

**Table (4): Type of anesthesia for tracheostomy:**

<b>Type of Anaesthesia</b>	<b>Patients, no., (%)</b>
Local	93(74.4%)
General	32(25.6%)

Eighty nine tracheostomies (71.2%) were performed in the operating room, while six cases (6.4%) were done in the emergency department, table (5).

**Table (5): Site of the operation:**

<b>Site of the operation</b>	<b>Patients, no., (%)</b>
Operating room	89(71.2%)
Respiratory care unit	28(22.4%)
Emergency department	8(6.4%)

In fifty three patients (42.4%) one or more complications were noted during or after the operative procedure. Wound infection and subcutaneous emphysema were the commonest complications. One death related to tracheostomy was recorded (table 6).

**Table (6): Complications of tracheostomy:**

<b>Complications</b>	<b>Patients, no., (%)of patients with complications</b>
Wound infection	23(43.4%)
Subcutaneous emphysema	14(26.4%)
Wound bleeding	10(18.8%)
Excessive crustation and tube obstruction	9(16.9%)
Dysphagia	5(9.4%)
Dislodgment of the tube	3(5.6%)
Spill over	2(3.7%)
Apnea	1(1.9%)
Death	1(1.9%)

Out of eighty three patients with urgent tracheostomies, forty two patients (50.6%) developed complications while eleven cases (26.1%) had complications out of the forty two with elective tracheostomies, table(7).

**Table (7) : Correlation of early Complications to timing of tracheostomy:**

<b>Urgency of the procedure</b>	<b>No. of Patients</b>	<b>Patients with early complications no, (%)</b>
Urgent	83	42(50.6)
Elective	42	11(26.1)

Forty five complicated procedures (48.3%) followed the ninety three tracheostomies performed under local anaesthesia, while out of thirty two patients with tracheostomy under general anaesthesia; eight had complications (25%), table (8).

**Table (8) : Correlation Early Complications to type of anaesthesia**

<b>Type of Anesthesia</b>	<b>No. of Patients</b>	<b>Patients with early complications no, (%)</b>
Local	93	45(48.3)
General	32	8(25)

The highest rate of complications occurred in the tracheostomies performed in the emergency departement six procedures out of eight (75%), and from the twenty eight operations done at bedside in Respiratory Care Unit, five patients (17.8%) developed complications,table(9).

**Table (9) : Correlation of early Complications to site of the operation**

Site of the operation	No. of Patients	Patients with early complications no, (%)
Operating room	89	42(48.8)
Respiratory Care Unit	28	5(17.8)
Emergency department	8	6(75)

Complications of tracheostomy were observed in 33.3% of pediatric tracheostomies, 44.8% of procedures done for patients between 15 to 49 years and in 40% of those 50 years old or above as seen in table (10).

**Table (10) : Correlation Early Complications to the age of patients:**

Age (years)	No. of Patients	Patients with early complications no, (%)
≤ 14	12	4(33.3)
15 – 49	78	35(44.8)
≥ 50	35	14(40)

**Discussion:**

Tracheostomy can prevent many deaths in otherwise fatal airway diseases and problems but has numerous complications that are mostly avoidable if the procedure is carefully performed together with strict postoperative management.

Most of studies have addressed the incidence of overall complications ranging from 5% to 40%.<sup>5</sup> Fifty three of our patients (42.4%) developed early complications.

Wound infection around tracheostomy was judged to be present by cellulitis and/or purulent or mucopurulent discharge. It was commonest complications in twenty three patients (43.4%) and this may be attributed to high rate of urgent tracheostomies in the study. In Hussam & Rasheed study eight patients out of nineteen with complications (50%) had tracheal stomal infection.<sup>6</sup>

Subcutaneous emphysema was the second common complications, occurred in fourteen patients (26.4%). It was seen mainly in urgent and difficult procedures. Patients who had already subcutaneous emphysema due to trauma were excluded from these figures. In our study, all the subcutaneous emphysema was confined to the subcutaneous tissue of the neck, settled down in approximately 5 to 7 days. In Hussam & Rasheed study, subcutaneous emphysema developed in (15.8%) of patients with complications.<sup>6</sup> Subcutaneous emphysema was the commonest complication in Orji FT et al series.<sup>7</sup>

The reported incidence of hemorrhage following tracheostomy varies from 1% to 37%. Fortunately, the vast majority is minor episodes of bleeding which are easily controlled by local measures<sup>8</sup>. In this study, ten patients (18.8%) had bleeding from the wound. They were treated successfully with local care apart from one case (female with status asthmaticus) need re-exploration of wound to control bleeding. There was no major bleeding in our study. In comparison, Dayal and EL. Masri et al stated that stomal bleeding occurred in 6 of a total 50 patients (12%); four of these had mild oozing and two had moderate bleeding.<sup>9</sup>

Nine patients (16.9%) in this study develop excessive crustation lead to brief obstructive episodes improved by suction or changing the tube. Most of these episodes were a result from inadequate nursing care. Simma et al series stated that obstruction of tracheostomy tube was encountered in eleven patients of twenty –one with complications (52%).<sup>10</sup> While Hussam & Rasheed stated that three patients (15.8%) develop tubal obstruction as an early complications.<sup>6</sup>

Dysphagia following tracheostomy may be due to tethering of trachea to skin or due to over inflated cuff which compress the esophagus.<sup>11</sup> During this study five patients (9.4%) were complained from dysphagia. In comparison, dysphagia following tracheostomy occurred in three patients (10.3%) of Hussam & Rasheed study.<sup>6</sup>

Tubal dislodgment is a potentially life-threatening complication, the reported incidences of tubal dislodgment from 0% to 7%<sup>12</sup>. In our study, although the tracheostomy tubes were sutured to the skin in all cases, three patients (6.5%) had tube dislodgment; one of them died because of this accidental decannulation. In Goldstein et al series two patients of the 124 patients (1.6%) developed tubal dislodgment<sup>13</sup>. None of the patients in Hussam & Rasheed study developed tube dislodgement.<sup>6</sup>

One case in this study who was 65 years old male with laryngeal carcinoma and severe stridor develop apnea once the trachea opened, resuscitation done to him but remained unconscious and referred to respiratory care unit. No similar case reported by previous study of Nabeel & Tahreer.<sup>14</sup> While in Hussam & Rasheed study one case of apnea was reported (2.5 %).<sup>6</sup>

The most frequent causes of tracheostomy- related death are cannula obstruction and accidental decannulation.<sup>15</sup> In our study one tracheostomy related death was recorded (0.8% of total number of patients) due to accidental decannulation. Van Zanten et al. stated that one child died out of 65 patients (1.5%) because of related cannula problem.<sup>16</sup> While there were no death as a direct result of the tracheostomy or its complication in Donnelly et al series<sup>17</sup> and in Hussam & Rasheed study<sup>6</sup>.

The complication rate after emergency tracheostomy is two to five times greater than after elective procedures<sup>18</sup>. We have been found that tracheostomy complications were higher in urgent procedures (50.6%) compared to elective operations (26.1%). This is in agreement to Nafi & Moyasser study who reported that the complication rate was (36%) in emergency situations while (17.9%) in elective procedures<sup>19</sup>. Similarly Hussam & Rasheed found that complications following urgent tracheostomy were (55%) while (27.5%) after elective operations.<sup>6</sup> However Waldron et al. reported no significant difference between the elective 24% and emergency 29% procedure with respect to complications.<sup>12</sup>

Operative complications of tracheostomy can be diminished by the use of general anaesthesia. It gives more time to the surgeon and it avoids patient irritability and movement during the procedure.<sup>20</sup> In our study (48.3%) tracheostomies performed under local anaesthesia were associated with complications, while (25%) of patients with tracheostomy done under general anaesthesia developed complications. Our findings in contrast to Waldron et al. who reported that the complication rate after general anaesthesia was 24.3% and 28.6% with local anaesthesia.<sup>12</sup> Moreover, in Nafi & Moyasser study no significant differences existed regarding complications, between tracheostomies performed under general anaesthesia 25.4% and those performed under local anaesthesia 33.3 %.<sup>19</sup>

The operating theatre is the safest and most comfortable place in which to perform tracheostomy.<sup>7</sup> Meanwhile open bedside tracheostomy at RCU has got wide acceptance

because of the risk of transporting a patient on ventilator, the increasing associated cost and operative room schedule.<sup>21</sup> in the present study out of eight urgent tracheostomies done at bedside in the emergency department six patients (75%) developed complications; this may be due to inadequate preparation and equipment at the emergency department. Five procedures (17.8%) out of twenty eight tracheostomies performed at the bedside at RCU had associated with complications. Wease GL et al reported that the rate of complication for bedside tracheostomy in the intensive care unit was (10.3 %);<sup>20</sup> so we believe that bedside tracheostomy at RCU can be performed with less morbidity rates compared to operative tracheostomy.

A review of medical literatures showed a pediatric tracheostomy as a surgical procedure with significant mortality and morbidity and complication rate greater were greater in children than adults.<sup>20</sup> Regarding our findings there were no significant difference in the complication rate between children and adults and this may be due to small number of children with tracheostomy in this study. In comparison, Nafi & Moyasser study showed a complication rate of (50%) in children and (29%) in adults.<sup>19</sup> similarly 50% was the rate of pediatric complication in Hussam & Rasheed study with 30% in adults.<sup>6</sup>

### **Conclusions:**

Tracheostomy at Medical City Complex was largely under taken as an urgent procedure. Most of early complications were due to the urgency of the procedure and inadequate postoperative nursing care. Wound infection was the commonest complications. The complication rate was higher in urgent procedures and in those performed under local anaesthesia.

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