

I-letno preživetje bolnikov v EIT po traheotomiji — izkušnja bolnišnice z majhnim številom bolnikov

I-year survival rate of ICU patients undergoing tracheotomy, a low volume hospital experience

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Izvleček

Namen: Veliko kritično bolnih pacientov tekom hospitalizacije v EIT (Enota intenzivne terapije) potrebuje traheotomijo. Namen študije je bil ugotoviti, koliko pacientov, ki jim naredimo traheostomo, preživi hospitalizacijo in koliko je živih 1 leto po posegu.

Metode: Retrospektivno smo v študijo vključili 144 pacientov, ki jim je bila tekom hospitalizacije v EIT UKC Maribor v letu 2015 opravljena traheotomija. Primerjali smo rezultate med PIT (Perioperativna intenzivna terapija) in OIIM (Oddelek za intenzivno interno medicino).

Rezultati: Študija je pokazala, da je preživetje kritično bolnih pacientov po traheotomiji majhno. Po enem letu živi

Abstract

Purpose: Many critically ill patients require a tracheotomy during their ICU (Intensive Care Unit) stay. The aim of this study was to determine how many patients that undergo this procedure survive the hospital stay and are alive 1 year after the procedure.

Methods: We retrospectively included 144 patients who had tracheotomies during their ICU stay at the UMC (University Medical Centre) Maribor in 2015 and compared the survival between patients hospitalized in the MICU (Medical Intensive Care Unit) and SICU (Surgical Intensive care unit).

Results: This study showed that survival after tracheotomy in critically ill

brez traheostome samo 9,7 % vseh pacientov. Razlike med PIT in OIIM, ki so bile statistično pomembne, smo opazovali samo po odpustu iz EIT. Več bolnikov je preživelo OIIM.

Zaključek: Glede enoletnega preživetja pacientov, hospitaliziranih v EIT, ki so jim opravili traheotomijo, smo našli malo podatkov. Iz navedenega zaključujemo, da je potrebno opraviti več raziskav na to temo.

patients is low. Only 9.7% of all patients live without a tracheostomy after 1 year. The differences that were statistically significant between the MICU and SICU were observed only after the discharge from the ICU, with more people surviving the MICU stay.

Conclusions: There is little information involving 1-year survival rates of patients undergoing tracheotomies. We conclude that more studies regarding this issue need to be conducted.

INTRODUCTION

A tracheotomy is one of the most common surgeries performed in critically ill patients. The main indications for a tracheotomy are prolonged intubation, easier weaning from mechanical ventilation, more efficient pulmonary hygiene, upper airway obstruction, airway protection, and as an adjunct to head and neck trauma management. We present the results of a 1-year retrospective study of tracheotomies performed on MICU and SICU patients hospitalized at the UMC Maribor in 2015. Only open surgical procedures are performed at our institution. The complication rates after the procedure are low and comparable to other studies. The 1-year survival rate of these patients is low (9.72%), which is inconsistent compared to other studies.

METHODS

We performed a single center retrospective study in adult medical and surgical ICU patients with surgical tracheotomies performed from 1 January to 31 December 2015. Institutional Ethics Committee¹ approval was obtained (No. 81/12). The inclusion criterion was a surgical tracheotomy performed during the ICU stay.

Clinical data were obtained by chart review from the medical database (MEDIS), as follows: the day of tracheotomy was performed; the duration and survival

of the ICU stay; alive at discharge from the UMC Maribor; duration of the hospital stay; complications related to the tracheotomy during the hospital stay; surgical revision related to the tracheotomy during the hospital stay; death related to the tracheotomy during the hospital stay; decannulation during the hospital stay; tracheotomy closed during the hospital stay; decannulated after the discharge from the hospital at 6 and 12 months; patient alive after being discharged from the hospital at 6 and 12 months; tracheotomy closed after the discharge at 6 and 12 months; any complication related to the tracheotomy after the discharge; and strictures of the trachea at any time during 12 months after the tracheotomy. Complications of the tracheotomy were defined as a need for Otorhinolaryngology specialist intervention.

Tracheotomies were performed surgically in operating rooms by Otorhinolaryngology surgeons. The technique used was a horizontal or vertical midline neck incision with tissue preparation and thyroid gland elevation. The anterior part of the trachea was usually cut between the 2nd and 3rd tracheal ring, the trachea was sewn to the skin, and a tracheostomy tube was inserted. The patient was then transferred back to the ICU. Statistical analysis was performed using SPSS² software package 19A. A p-value < 0.05 was considered statistically significant.

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RESULTS

In our study we reviewed tracheotomies performed at the University Medical Center Maribor between 1 January and 31 December 2015. A total of 144 tracheotomies were performed on patients admitted to the medical intensive care unit (MICU) and surgical intensive care unit (SICU). Of the patients, 52% (N = 76) were admitted to the MICU and 48% (N = 68) were admitted to the SICU. The largest percentage of ICU diagnoses in the MICU were as follows: sepsis, 45%; acute myocardial infarction, 33%; and cerebrovascular insult, 9.2%. The largest percentage of ICU diagnoses in the SICU were as follows: intracranial hemorrhage, 37%; polytrauma, 24%; and post-abdominal surgery, 22%. After discharge from the hospital, 7.6% of patients (N = 11) were lost to follow-up due to an inability of acquiring information from hospitals where the patients were transferred.

The mean age for patients in the MICU was 66.83 ± 11.37 years at MICU and 64.83 ± 14.53 years for patients in the SICU ($p = 0.3546$). Of patients in the MICU and SICU, 73.68% (N = 56) and 57.35% (N = 39) were males, respectively ($p = 0.0524$).

Of patients in the MICU tracheotomies were performed on day 9 (range, 6.5–13 days) compared to day 17 in the SICU (range, 14–21 days; $p < 0.00001$). The average ICU duration of treatment was 16 days for MICU patients (range, 11–25 days) and 22 days for SICU patients (range, 18–30 days; $p = 0.00046$). The

hospital duration of treatment was shorter for MICU patients (average, 31 days; range, 18–53,75 days) compared with 51 days for SICU patients (range, 25–80 days; $p = 0.00044$; Table 1).

No deaths were attributed to tracheostomy-related complications. The cumulative discharge from the ICU was 77% (n = 111). The number of patients discharged alive from the ICU was higher among SICU patients (61 [89.70%]) than MICU patients (50 [65.78%]; $p = 0.0007$). The number of patients discharged alive from the hospital was 29 (38.15%) for MICU patients compared to 36 (52.94%) for SICU patients ($p = 0.0671$). The cumulative hospital discharge rate was 45% (N = 65).

Of MICU patients, 21.06% (N = 16) were decannulated at the time of hospital discharge compared with 11.76% (N = 8) for SICU patients ($p = 0.1796$). Within the MICU 1.31% (N = 1) of MICU patients had tracheotomy closed at hospital discharge compared with 4.41% (N = 3) within SICU, $p = 0.3438$.

We followed the patients for 12 months after discharge from the hospital. Six months after discharge 16.67% (N = 24) of the patients were alive (13 [17.10%] MICU patients and 11 [16.17%] SICU patients; $p = 1.0$) and 12 months after discharge 11.11% (N = 16) of the patients were alive (11 [14.47%] MICU patients and five [7.35%] SICU patients; $p = 0.1957$). We also determined how many patients were alive and had a tracheotomy closed for 12 months after discharge. At 6 months after discharge, 14.47% (N = 11) of patients from the MICU were alive and had a tracheotomy

closed compared with 8.82% (N = 6) of patients from the SICU ($p = 0.3159$). At 12 months after discharge, 13.15% (N = 10) of patients from the MICU were alive with a tracheotomy closed compared with 5.88% (N = 4) of patients from the SICU ($p = 0.1676$; Table 2).

In reviewing complication rates, we established that 8.3% (N = 12) of patients had complications related to tracheotomies during their hospital stay. Among the patients, 10.52% (N = 8) were from

Table 1: Patient characteristics

	MICU	SICU	P Value
Age (years \pm SD)	66,9 \pm 11.4	64.8 \pm 14.5	0,3546
Male sex (%)	73,7	57,4	0,0524
Day tracheotomy performed (day \pm IQR)	9 (6.5-13)	17 (14-21)	<0.00001
Average ICU duration of treatment (days \pm IQR)	16(11-25)	22(18-30)	0.00046
Hospital duration of treatment (days \pm IQR)	31(18-53,75)	51(25-80)	0.00044

Table 2: Discharge data from ICU, hospital, 6 months and 12 month

	No. (%) of Patients			P Value
	SICU	MICU	Total	
Status at ICU discharge Alive	61 (89.7)	50 (65.8)	111(77,1)	0.00007
Status at hospital discharge Alive	29 (38,2)	36(52,9)	65(45,1)	0.0671
Decannulated at hospital discharge	8(11,8)	16(21,1)	24(16,7)	0.1796
Tracheotomy closed at hops. disc.	3(4,4)	1(1,3)	4(2,8)	0.3438
Status at 6 months Alive	11(16,2)	13(17,1)	24(16,7)	1.0
Status at 1y	5(7,35)	11(14,5)	16(11,1)	0.1957
Tracheotomy closed at 6 months	6(8,8)	11(14,5)	17(11,8)	0.3159
Tracheotomy closed at 1y	4(5,9)	10(13,2)	14(9,7)	0.1676
Hospital duration of treatment (days ± IQR)	31(18-53,75)	51(25-80)	0.00044	0.1676

the MICU and 5.88% (N = 4) were from the SICU (p = 0.3762). The complications were distributed as follows: hemorrhage, 75% (N = 9); wound dehiscence, 16% (N = 2); and infection at the tracheotomy site, 8.3% (N = 1). Surgical revision during the hospital stay was required in 5.55% (N = 8) of the patients (MICU, seven [9.21%] and SICU, one [1.47%], p =

0.0661). After discharge from the hospital, only one patient from the MICU (1.31%) had a complication related to the tracheotomy, compared with no patients from the SICU (p = 1.0). No strictures involving the trachea were noted at any time during the 12 months after the tracheotomy (Table 3).

Table 3: Complications of tracheostomy

	No. (%) of Patients			P Value
	SICU	MICU	Total	
Complications related to tracheotomy	4(5,9)	8(10,5)	12(8,3)	0.3762
Surgical revision required	1(1,5)	7(9,2)	8(5,6)	0.0661
Stricture of trachea at any time during 1y after surgery	0 (0)	0(0)	0(0)	NA

DISCUSSION

A tracheotomy is a common procedure performed on patients in the ICU. There is an ongoing debate whether or not early or late tracheotomy gives patients an advantage with respect to long-term survival; recent studies have shown no differences (1,2). When reviewing the literature on patient survival after tracheotomy, there is little information regarding long-term survival (> 6 months after the procedure).

This study showed that hospital discharge for patients admitted to the ICU who underwent tracheotomy is low (45.14% [N = 65]). Those results are lower compared to previous studies from Restrepo et al.2, who found that 74% of patients were discharged alive from the hospital and the TracMan trial study1 showed that 59% were discharged alive. An in-hospital mortality of 48% was reported by Hsu et al.3, who also had a low sample size (n = 163); however, Hsu et al.3 did not follow-up with the surviving patients. Hsu et al.3 also reported a 19% ICU mortality rate, which is comparable to our cumulative ICU mortality rate of 23%. The 1-year survival of patients admitted to the ICU who underwent tracheotomy was very low. The total 1-year survival rate was 11.11% (N = 16), of which 9.72% (N = 14) were alive and had the tracheotomy closed. Restrepo et al.2 and the TracMan trial study1 found that 53% of patients were alive 1 year after discharge. Interestingly, in comparing the ICU mortality results to the TracMan trial study1, the ICU mortality rate was lower in our study (23% vs. 30%).

Another important fact is that more patients were discharged alive from the SICU than from the MICU, but discharge from the hospital showed no statistical significance.

Even though there are many indications for tracheotomy, in the majority of cases the procedure helps make room in the ICU for new patients. Because tracheotomy is mutilating for patients and since survival after the procedure is low, we believe that spatial stress in the ICU should not be the main indication.

Open surgical tracheotomy is a safe procedure with low complication rates³⁻⁵, which we also observed in our study (3-5). The most common complication after tracheotomy is hemorrhage (6). Almost all complications in our study were due to hemorrhage, and none of

the complications were life-threatening. We attribute the low incidence of complications to the fact that our ENT surgeons are proficient at this procedure because only open surgical tracheotomies are performed at our institution.

Survival assessment after tracheotomy is controversial, but a number of patients are not alive after 1 year. A low complication rate after tracheotomy suggests that the procedure itself does not increase the mortality rate. The Restrepo et al.2 and the TracMan trial study1, both reported that 53% of the patients were alive 1 year after discharge from the hospital, while our study showed that only 11.11% of patients were alive. Patients hospitalized in the ICU have a poor prognosis because of the underlying pathology, but it is less likely that patients who were hospitalized in UMC Maribor were sicker than patients included in the Restrepo et al.2 and TracMan trial study1. Interestingly, the cumulative ICU mortality rate in the TracMan trial study1 was higher (30%) than in our study (23%). This finding suggests that there are other factors influencing the 1-year survival of patients who undergo tracheotomy (not just the underlying pathology), such as poor patient care in the hospital wards. Identifying these factors exceeded the scope of this study.

Would there be a different outcome for these patients if tracheotomy was not performed? With the current data we cannot give a definitive answer. A prospective double-blind study would be required in which one group of patients would have tracheotomy performed and the other group would not. Difficult ethical dilemmas arise when designing such a study.

This study had limitations. It was a retrospective study observing a single operating procedure in the span of 1 year. Sub-group analysis of different populations was not performed due to the small cohort. Patients from the MICU and SICU differ regarding ICU admission pathology. An objective severity-of-disease classification system would make the comparison between the two sub-groups clearer, but no systematic classification of patients was found on retrograde chart review.

The aim of the study was to determine how many patients are alive and probably normal functioning (tracheotomies closed) after 1 year of the procedure. We found no tracheal stenosis after tracheotomy. Because we do not follow up all the patients who undergo this

procedure clinically, we do not have the data regarding tracheal stenosis at present.

CONCLUSION

Open surgical tracheotomy remains a safe procedure with a low incidence of complications. The 1-year sur-

vival of ICU patient undergoing this procedure is low. This could be due to a low sample size used in this study, but it could also be a reflection of the Slovenian patient distribution. Our institution is one of two university hospitals in the country, consequently patients with the worst prognosis are pooled inside the institution. We suggest further research regarding long-term survival after tracheotomy.

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