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A Case Series of Percutaneus Dilatasional Tracheostomy (PDT) in Cerebrovascular Disease

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ABSTRACT

Penyakit jaringan otak sering kali membutuhkan manajemen proteksi jalan nafas. Intubasi dan PDT merupakan opsi dari prosedur guna mempertahankan patensi jalan nafas. PDT dapat menurunkan resiko pneumonia dan mempermudah penyapihan bentilator. PDT dilakukan di ruang ICU dan dilakukan anesthesiologist senior dan terdapat 12 kasus yang dikumpulkan serta dicatat kemudian dibagi menjadi 2 kelompok grup yakni dilakukan PDT awal (kurang dari 7 hari setelah intubasi) dan PDT ahir (lebih dari 7 hari setelah intubasi). Terdapat 3 set PDT yang dilakukan sterilisasi ulang oleh tim CSSD RSUD Ciawi yang kemudian di Analisa usap instrument oleh tim BLKK dari Jakarta. Semua manajemen PDT dilakukan secara berhasil tanpa adanya komplikasi, hasil lauran pasien pada kedua grup tidak berbeda jauh. Jumlah hari yang dibutuhkan untuk penyapihan ventilator, evaluasi kultur sputum dan instrumen PDT dicatat dan di tampilkan. Penelitian lebih lanjut dibutuhkan untuk melihat keuntungan PDT dan waktu terbaik prosedur dilakukan. Penggunaan set PDT berulang yang disterilisasi menggunakan cairan dekonek dan di suhu dingin dapat memnghindari dari infeksi bakteri.

Kata kunci: Vaskularisasl otak, penyakit, PDT, komplikasi, luaran

ABSTRACT

Critically ill patients with cerebrovascular disease may require airway securing management. Airway management is defined as an intervention using a technique, maneuver or a device to keep its patency, providing oxygen and removing carbon dioxide. Endotracheal intubation (ETI) and percutaneus dilatational tracheostomy (PDT) are procedure to keep the patency of airway. Percutaneous dilatational tracheostomy may decrease the risk of pneumonia and facilitate weaning ventilator. Twelve cases of PDT performed by attending senior anesthesiologist were divided into two groups, early (less than 7 days after intubation) and late (more than 7 days after intubation). There are three re-use PDT set which sterilized in CSSD unit of RSUD Ciawi and cultured by BLKK team in Jakarta. All of the PDT procedure were successfully performed without any complication and has a similar outcome in both groups. Complications and adverse consequences, which occurred during the procedures, as well as days needed to weaning ventilator, sputum and PDT instrument culture evaluation were recorded. Further studies are required to elucidate the advantage of PDT and finding the best time to perform PDT procedure in patients with cerebrovascular disease. Re use PDT set which sterilized in deconect liquid and cold themperature could be safe from bacterial infection.

Kata kunci: cerebrovascular disease, airway management, percutaneous dilatational tracheostomy, complication

Introduction

Cerebrovascular disease has a several neurological deficit severity, mild, moderate and severe, reversible or irreversible based on location, degree of illness, comorbid diseases and timing of treatment. Glasgow coma scale less than eight need an intubation to secure airway, intubation should be done until weaning ventilator and extubation. In almost severe cerebrovascular disease weaning ventilator are not as easily as in other condition, percutaneous dilatational tracheostomy may facilitate weaning ventilator, reduce ventilator associated pneumonia and decrease length of stay in ICU.

Percutaneous dilatational tracheostomy (PDT) is a commonly performed procedure in critically ill patients. It can be safely performed bedside by intensivists. This has resulted in decline in the use of surgical tracheostomy in intensive care unit (ICU) except in few selected cases. Most common indication of tracheostomy in ICU is need for prolonged ventilation. About 10% of patients requiring at least 3 days of mechanical ventilator support get tracheostomised during ICU stay. The ideal timing of PDT remains undecided at present.[1]

Tracheostomy is one of the oldest and most commonly performed procedures in critically ill patients. Surgical tracheostomy (ST) was first described by Jackson in 1909. Its use in Intensive Care Unit (ICU) gained popularity during polio epidemic in the 1950's. Percutaneous dilatational tracheostomy (PDT) over a guidewire was invented by Ciaglia in 1985. PDT has now become the standard of care in ICU and has replaced ST in this subset of patients to a large extent. It however remains imperative to be aware of conditions where ST may be preferable. Over the last few years, the original Ciaglia PDT technique has undergone modifications, and multiple other techniques have also evolved.[2]

Best of evidence, in the form of randomized controlled trial (RCT), does not show any benefit of early (<10 days of intubation) when compared to late tracheostomy (>10 days of intubation). No benefit has been observed in terms of mortality, ventilator-associated pneumonia, laryngotracheal complications, and ICU length of stay. Some benefit has been observed in the form of reduced ventilatory stay. Recent guidelines have found insufficient evidence at present for any recommendation to be made regarding this.[3]

There were twelve cases which divided into two groups, early (less than 7 days after intubation) and late (more than 7 days after intubation). There are three PDT set of ciaglia for twelve case, which sterilized in CCSD team of RSUD Ciawi with deconect liquid and put in cold themperature in 55^{O}C for 55 minute in dry plasma machine. The aims of this research are to observe a number of days needed to weaning ventilator after PDT, length of stay in ICU, bacteria culture profile of PDT set,

bacterial culture from patient's sputum and final outcome of the patients.

Case

1. Mrs E 31 y.o come to ICU (22-10-2021) with decreasing of consciousness, suspect meningoencephalitis, tuberculosis. Intubation was perfomed in ER (20-10-2021), PDT in 29-10-2021, sputum culture (29-10-2021) Enterobacter cloacae complex. Patient was dead in 2-11-2021.
2. Mrs Si 39 y.o, come to ICU (25-9-2021) with decreasing of consciousness suspect SH or SNH. Intubation was performed in ICU (26-9-2021), PDT in 1-10-2021, sputum culture (2-10-2021) pseudomonas aeruginosa, bloodstream culture (16-10-2021) staphylococcus hominis. Patient step down to ward in 19-10-2021.
3. Mr J 34 y.o, come to ICU (24-9-2021) after VP shunt procedure because hydrocephalus communicant, meningoencephalitis tuberculosis. Intubation was perfomed in operation room (23-9-2021), PDT in 29-9-2021, sputum culture (3-10-2021) klebsiella pneumonia. Patient was dead in 5-10-2021.
4. Mr S 22 y.o come to ICU (8-9-2021) after vp shunt procedure because of hydrocephalus, supect tumor of medulla spinalis and pneumonia. Intubation was performed in operation room (8-9-2021), PDT in 17-9-2021, sputum culture (21-0-2021) streptomonas maltophilia. Patient was dead in 19-9-202.
5. Mrs Y 57 y.o, come to ICU (3-6-2021) with cerebrovascular desease , SNH, ARDS. Intubasion was performed in ER (30-5-2021), PDT in 8-6-2021, sputum culture (12-6-2021) pseudomonas auroginosa, dead in 14-6-2021.
6. Mrs M 69 y,o. come to ICU (1-12-2021) with cerebrovascular disease after EVD procedure. Intubation was performed in operation room (1-12-2021), PDT in 8-12-2021, sputum culture (4-12-21) klebsiella pneumonia. Patient dead in 9-12-2021.
7. Mrs D, 56 y.o, come to ICU (30-11-2021) after VP shunt procedure because subdural hematoma, IVH, SAH, hydrocephalus. Intubation was performed in operation room (30-11-2021) PDT in 7-12-2021, sputum culture (6-12-2021) klebsiella pneumonia. Patient dead in 10-12-2021.
8. Mr I, 64 y.o, come to ICU (4-11-2021) after craniotomi procedure of ICH. Intubation was performed in operation room (4-11-2021), PDT in 12-11-2021, sputum culture (7-11-2021) klebsiella pneumonia, (14-11-2021) Acinetobacter baumanii. Patient was dead in 14-11-2021.
9. Mr In 58 y.o, come to ICU (1-11-2021) with ICH in regio of pons, intubation was performed in ICU (9-11-2021), PDT in 12-11-2021, sputum culture (6-11-2021) Acinetobacter baumanii. Patient was dead in 15-11-2021.
10. Mrs S 19 y.o, come to ICU (6-3-2021) with meningoencephalitis TB, hydrocephalus.

Intubstion was performed in ER (4-3-2021), PDT in 16-3-2021, sputum culture (16-3-2021) pseudomonas aeruginosa, urine culture (16-3-2021) pseudomonas putida. Patient was step down ward in 21-3-2021.

11. Mrs L 49 y.o, come to ICU (26-7-2020) after craniotomy procedure of ICH. Re intubasion was performed in ICU (5-8-2020), PDT 10-8-2020, sputum culture (4-8-2020) staphylococcus epidermidis, (16-8-2020) seratia marcesnens. Patient step down ward in 20-8-2020.
12. Mr D 16 y.o, come to ICU (20-9-2020) with EDH, fracture of femure, intubation in ICU (25-9-2020), PDT (29-9-2020, sputum culture (2-10-2020) Enterobacter aerogens. Patient step down ward 11-10-2020.

Discussion

Twelve sample was divided into 2 group each different from PDT procedure before (group 1) and after seven day after intubation.

Table 1. list of Group 1 (PDT ≤ 7 day)

GRUP 1

No	Name	Day PDT	Day of weaning	Outcome	Diagnose	Culture	Culture PDT
1	Mr I	7	3	+	ICH post op	klebsiella pneumonia	N/A
2	Mr In	3	6	+	ICH pons	acinetobacter baumanii	N/A
3	Mrs M	7	1	+	CVD recurrent post evd	klebsiella pneumonia	N/A
4	Mrs L	5	10	stepdown	ICH post kraniotomi	staphylococcus epidermidis, seratia marcesnens	N/A
5	Mr D	5	43	stepdown	EDH post kraniotomi	enterobacter aerogens	N/A
6	Mrs Si	6	18	stepdown	ME TB hidrochepalus	pseudomonas aeruginosa. Urine culture, pseudomonas putida	N/A
7	Mr J	6	7	+	Hidrochepalus ,ME, TB ,post vp shunt	klebsiella pneumonia	N/A

Table 2. list of group 2 (PDT > 7 day)

GRUP 2

No	Name	Day PDT	Day of weaning	Outcome	Diagnose	Culture	Culture PDT
1	Mrs E	9	3	+	Susp TB	Citrobacter Freundii. & Enterobacter cloacae complex.	N/A
2	Mrs S	12	5	stepdown	SH dd SNH	sputum pseudomonas aeruginosa. Urine : pseudomonas putida.	N/A
3	Mrs D	8	3	+	Subdural hematom,IVH,SAH,Hidrosepalus, post VP shunt	klebsiella pneumonia	N/A
4	Mr S	9	2	+	Pneumonia,medulla spinalis tumor, post vp shunt	streptomonas maltophilia	N/A
5	Mrs Y	9	7	+	CVD SNH, ARDS,pneumonia	pseudomonas auroginusa	N/A

Mortality rate in group 2 (late) is higher compared to group 1 (early) 80% vs 71%, different from date of weaning ventilator mean of group 1 higher from group 2 (59 days vs 5) because in group 2 only one case survival/step down ward. Previously published paper reported the length of stay in ICU was shorter in early group compared to late group of tracheostomy ($p < 0.001$).[4] From table 1&2 there is no significance number of death from early and late PDT, zheng in 2012 that the early PDT (<3day) resulted in more ventilator-free, sedation-free, and ICU-free days, higher successful weaning and ICU discharge rate, and lower incidence of VAP, but did not change the cumulative 60-day incidence of death in the patients' anticipated requiring prolonged mechanical ventilation.[5]

The best timing to do PDT procedure is still debatable. The largest randomized clinical trial to date, the UK TracMan trial on tracheostomy at day 4 versus day 10 (or more) in 909 mixed ICU patients, demonstrated safety between early and late tracheostomy, but no other relevant benefit of early tracheostomy than less sedation need. [6]

The PDT set culture was performed by BLKK in Jakarta (government laboratorium)

there were checked of 3 bacteria such as streptococcus pyogenes, pseudomonas aenginosa, Staphylococcus aureus, E coli, and there is no found of bacteria after culture test, which mean same re use PDT set could not make any complication, this condition relatively same with other research which is no significant difference in the incidence of complications in stroke subjects undergoing early (<7 day)versus standard tracheotomy(> 7day).[7]

Conclusion

Timing of PDT procedure still debatable. Using re use PDT set which sterilized in deconect liquid and put in cold themperature in 55^{O}C for 55 minute in dry plasma machine could be safe from bacterial infection. Further studies are required to elucidate the advantage of PDT and finding the best time to perform PDT procedure in patients with cerebrovascular disease.

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