

Percutaneous dilatational tracheostomy compared with conventional surgical tracheostomy in neurosurgery intensive care unit



Shiwani Rai¹, Suman Adhikari², Prabin Bhandari², Krishna Prasad Koirala³,
Balgopal Karmacharya⁴, Nikunja Yogi⁴

¹Assistant Professor, Department of ENT, Manipal Teaching Hospital, Pokhara, Nepal, ²Medical Officer, Department of Neurosurgery, Manipal Teaching Hospital, Pokhara, Nepal, ³Associate Professor, Department of ENT, Manipal Teaching Hospital, Pokhara, Nepal, ⁴Associate Professor, Department of Neurosurgery, Manipal Teaching Hospital, Pokhara, Nepal

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ABSTRACT

Background: Tracheostomy is a commonly performed procedure in intensive care units (ICU). Percutaneous dilatational tracheostomy (PDT) has achieved wide acceptance recently since its first introduction by Ciagila in 1985. **Aims and Objective:** The current study was designed and aimed to compare conventional tracheostomy (CT) with percutaneous dilatational tracheostomy using Grigg's GWDF technique in terms of operative timing, duration of ICU and hospital stay and complications. **Materials and Methods:** A prospective, single blinded, randomized study was done in between April 2019 to December 2019. Patients were randomly assigned into CT group and PDT group of 32 patients in each group. Data were recorded in terms of demographics, preoperative diagnosis, GCS, comorbidities, ICU stay, hospital stay, decanulation time, operative time and various complications. Data were compared using student's t test for continuous variables and Chi-squared test or Fisher's exact test for categorical variables. Data were analyzed using IBM SPSS statistics version 20. **Results:** Mean operative time in CT group was 35.00 ± 9.56 min and in PDT group was 18.17 ± 8.78 min and the difference was statistically significant ($p=0.00$). Similarly, there was statistically significant difference in overall complications in between conventional and percutaneous dilatational tracheostomy group. However, there was no significant difference in terms of total ICU stay, hospital stay and tracheostomy decanulation time in between these group. There was no statistical difference in between individual category of complications in between the two study groups. **Conclusion:** Percutaneous dilatational tracheostomy is equally safe and effective as conventional tracheostomy but with lower incidence of overall complications and faster to perform.

Key words: Complication; Dilatation; Operative time; Tracheostomy

INTRODUCTION

Tracheostomy is a commonly performed procedure in intensive care units (ICU) to provide a safe airway for patient requiring prolonged mechanical ventilation and secure airway in many neurological and traumatic conditions. Conventional tracheostomy (CT) is one of the oldest surgical procedure existing for more than 3000 years and standardized by Jackson.¹ Intraoperative and

postoperative complications like bleeding, cellulitis, stomal infection, etc are quite frequent with CT. Percutaneous dilatational tracheostomy (PDT) has achieved wide acceptance recently since its first introduction by Ciagila in 1985 where dilatation was performed gradually from small to large blunt serial dilators.² Later Grigg's modified this technique by adding a guidewire dilating forceps (GWDF), which was similar to modified Howard-Kelly forceps.³ There are other various techniques of percutaneous

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Address for Correspondence:

Dr. Shiwani Rai, Assistant Professor, Department of ENT-HNS, Manipal Teaching Hospital, Pokhara Nepal. **Phone:** 00977-9816673508.
E-mail: shiwani.raimanipal.edu.np

dilatation techniques used worldwide these days all based on seldinger's technique.²⁻⁷

In this study, we tried to compare conventional tracheostomy (CT) with percutaneous dilatation tracheostomy using Grigg's GWDF technique in terms of operative timing, duration of ICU and hospital stay and complications.

MATERIALS AND METHODS

A prospective, single blinded, randomized study was done in between April 2019 to December 2019 in patients admitted in neurosurgical intensive care unit (ICU) of Manipal Teaching Hospital, Pokhara, Nepal and requiring tracheostomy. Patient above 18 years of age and requiring tracheostomy were included in the study. Patients were randomly assigned into one of the two groups; group 1 consisted of patients who underwent conventional tracheostomy (CT) and group 2 consisted of those who underwent percutaneous dilatation tracheostomy (PDT). Randomization was done using sequentially numbered, opaque sealed envelopes. After decision of tracheostomy and consent from the relative of the patient, while randomizing the patient, an already sequentially numbered envelope was picked up and the name of the patient was written on the envelope by the ICU sister on duty before opening it. The patient was then allotted to the group according to randomization and the operation team were informed to prepare for either CT or PDT accordingly.

Sample size calculation was done using sample size calculator from www.select-statistics.co.uk. Overall complication of conventional tracheostomy from previous literatures was found to be 36-41% and percutaneous dilatation tracheostomy was found to be 6-12%.^{8,9} Thus, keeping sample proportion of group 1 as 38%, sample proportion of group 2 as 9%, confidence interval of 95% and power of 80%, sample size calculated was 30 for each group.

All patients aged 18 or above were included in the study. Patients who did not consent for the surgery or the study, those with history of previous tracheostomy, previous neck surgery, thyromegaly or any neck mass, infection at proposed operative site, extreme obesity and those with unstable cervical spine or in whom neck extension is contraindicated were excluded from the study. Ethical clearance was undertaken from Institutional Review Committee while the study was carried out.

All patients were operated in the operation theatre under general anesthesia by a consultant ENT surgeon or a Neurosurgeon. Percutaneous dilatation tracheostomy

was performed using the Grigg's guidewire dilating forceps technique. A horizontal incision of around 1 cm was made approximately 2 finger breadth above the suprasternal notch. The endotracheal (ET) tube was withdrawn gradually by the anesthesiologist till the tip lied just beyond the vocal cord and then the trachea was punctured using a 14-gauge needle confirmed by aspirating air on a syringe partially filled with distilled water. At times the needle might puncture the ET tube after puncturing the trachea which can be cross-checked by moving the ET tube in an out gently with the needle in situ. If the needle is embedded in the tube it moves both with to and fro movement whereas if it has not embedded the ET tube it moves only with forward movement of the ET tube (as it hits the needle) and not while backwards movement of the tube. A J-tip guidewire was then inserted through the needle. The stoma was initially dilated with a dilating cannula passed over the guide wire and then a guidewire-tipped dilating forceps (GWDF) was passed through the guidewire into the trachea and the opening was dilated. The process was repeated till an adequate dilatation was achieved. Percutaneous tracheostomy tube of appropriate size with a central lumen in the obturator to allow passage over the guide wire was then inserted and secured inflating the tracheostomy cuff. Guide wire was then removed and tracheostomy position confirmed by auscultation and the ET_{CO₂} level in the monitor. The ET tube was removed and the tracheostomy tube further secured with sutures and ribbon. Conventional tracheostomy was performed in usual fashion with a 2-3 cm horizontal incision at around two finger breadth above the suprasternal notch. The thyroid isthmus was retracted superiorly, 2nd tracheal ring was incised and a suitable sized tube was inserted.

Data were recorded in terms of demographics, preoperative diagnosis, GCS of the patient at the time of intubation, comorbidities, total duration of ICU stay, total duration hospital stay, decanulation time (time from tracheostomy to removal of tracheostomy tube), operative time and various complications. Operative time was noted from painting and draping of the operative site to fixing of the tracheostomy tube. Complications were recorded during operation and postoperative period and follow-up at 3 months. Major bleeding was defined as those requiring cauterization or ligation of blood vessels or requiring blood transfusions and surgical exploration postoperatively. Minor bleeding was defined as those controlled by pack dressing with or without epinephrine.

All data are presented as mean and standard deviations for continuous variables and numbers (percentages) for categorical variables. Data were compared using student's t test for continuous variables and Chi-squared test or

Fisher’s exact test for categorical variables. Data were analyzed using IBM SPSS statistics version 20.

RESULTS

The mean age of the study population was 47.57 ± 18.92 years. There were 34 (43.3%) males and 26 (56.7%) female in the study. The age and gender distribution in both PDT group and CT group along with baseline GCS and comorbidities has been depicted in Table 1. There was no significant difference in terms of baseline status in between the two groups. Figure 1 shows the diagnosis at admission of patients who went tracheostomy in our series. Trauma (25, 42%), cerebrovascular accidents (16, 27%) and aneurysmal subarachnoid hemorrhages (9, 15%) were the commonest admission diagnosis.

Mean operative time in CT group was 35.00 ± 9.56 min and in PDT group was 18.17 ± 8.78 min and the difference

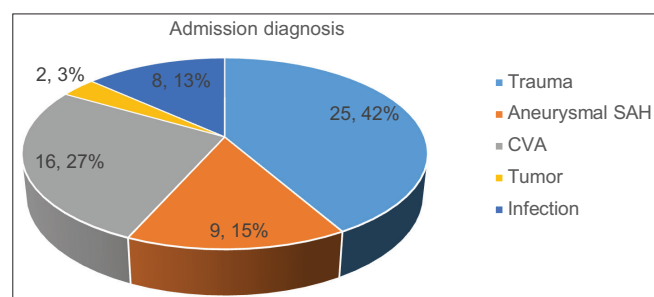


Figure 1: Diagnosis of patients undergoing tracheostomy

S.no	Parameters	Conventional Tracheostomy (N=30)	Percutaneous Dilatation Tracheostomy (N=30)	P Value
1	Age	49.37±19.98	45.77±17.96	0.46
2	Gender			
	Male	18 (60%)	16 (53.3%)	0.60
	Female	12 (40%)	14 (46.7%)	
3	GCS	8.60±4.03	8.93±3.12	0.72
4	Comorbidities			
	DM	10 (33.3%)	12 (40%)	0.59
	HTN	13 (43.3%)	8 (26.7%)	0.17
	CKD	3 (10%)	2(6.7%)	1.00

was statistically significant ($p=0.00$). Similarly, there was statistically significant difference in overall complications in between conventional (11, 36.7%) and percutaneous dilatation tracheostomy group (4, 13.3%) ($p=0.03$). However, there was no significant difference in terms of total ICU stay, hospital stay and tracheostomy decanulation time in between these groups (Table 2).

Table 3 shows various intraoperative and postoperative complications and their complications in between two groups. Intraoperative major and minor hemorrhage and post-operative major hemorrhage were the most common complications seen in CT group. Post-operative major hemorrhage was seen in 2 (6.7%) cases in PDT group which needed exploration and cauterization in the operation theatre. There were 3 (10%) cases of false track in CT group whereas one (3.3%) cases had false track developed in PDT case intraoperatively. There were no cases of conversion from PDT to CT in our series. Accidental decanulation was more common in CT (3, 10%) group than PDT group (1, 3.3%). Surgical site infection was almost similar in both the groups. There was no statistical difference in between individual category of complications in between the two study groups (Table 3).

DISCUSSION

Tracheostomies are commonly performed procedure in neurosurgical ICU to protect airway from aspiration injuries seen in many neurological conditions, in cases of craniofacial traumas and as an aid in pulmonary toileting and securing airway in cases requiring prolonged mechanical ventilation.¹⁰

Conventional tracheostomy (CT) although has been widely accepted and been in practice for long time but still has many complications, with an overall incidence of 36-41%, including pneumothorax, subcutaneous emphysema, bleeding, tube dislodgements, stomal infections and although very less at times mortality.⁹ With the advent of seldinger technique it has been almost replaced by percutaneous dilatation tracheostomy (PDT) in many places.^{11,12} PDT on the other hand has reduced incidence of wound infections, clinically significant bleeding, major

S.no	Parameters	Conventional Tracheostomy (N=30)	Percutaneous Dilatation Tracheostomy (N=30)	P Value
1.	ICU stay	20.87±6.89	17.47±7.72	0.07
2.	Hospital Stay	38.97±16.66	32.00±13.81	0.08
3.	Decanulation Time	29.30±10.6	25.30±10.88	0.14
4.	Operative Time	35.00±9.56	18.17±8.78	0.00*
5.	Complications			
	Yes	11 (36.7%)	4 (13.3%)	0.03*
	No	19 (63.3%)	26 (86.7%)	

Table 3: Various intra and postoperative complications in both the groups

S.no	Parameters	Conventional Tracheostomy (N=30)	Percutaneous Dilatation Tracheostomy (N=30)	P Value
1	Intraoperative major Hemorrhage	5 (16.7%)	1 (3.3%)	0.19
2	Intraoperative minor Hemorrhage	5 (16.7%)	2 (6.7%)	0.42
3	Intraoperative desaturation	1 (3.3%)	0(%)	1.00
4	False Track Intraoperative	3 (10%)	1 (3.3%)	0.61
5	Postoperative major Hemorrhage	5 (16.7%)	2 (6.7%)	0.42
6	Postoperative minor Hemorrhage	1 (3.3%)	0(%)	1.00
7	Decanulation	3 (10%)	1 (3.3%)	0.61
8	Surgical Site Infection	3 (10%)	2 (6.7%)	1.00

peri-procedural or long term complications and also short procedure time in comparison to CT.^{1,12}

In this study we tried to compare CT and PDT techniques in terms of ICU stay, hospital stay, decanulation time and complications. The mean duration of ICU stay in CT group was 20.87±6.89 days and PDT was 17.47±17.72 days. The mean duration of hospital stay in CT group was 38.97±16.66 and PDT was 32.00±13.81 days. The mean duration of decanulation (time from tracheostomy to removal of tracheostomy tube) in our study was 29.30±10.6 days for CT and 25.30±10.88 days for PDT. There was no statistical significant difference in between the two groups in term of these parameters. Kwon J et al in their study has also reported no statistically significant difference in outcome in these two groups in terms of mortality, ICU stay and hospital stay.^{13,14} Silvester W et al in their study have noted no significant difference in decanulation time in between CT (median 21 days) and PDT (median 19 days) groups which is in consistent with our findings.

The mean operative time in CT group was 35.00±9.56 minutes and in PDT group was 18.17±8.78 minutes and the difference was statistically significant (p= 0.00). This finding was consistent with various similar studies performed before. Operative time for PDT in literature varies from 4.3 min to 20.1 min and that of CT varied from 13.5-41.7 min. The duration of PDT varies with various factors like experience of the operating surgeon or doctor, technique of PDT used and use of bronchoscope etc.

In our series, we noted that overall complication was lower in PDT (4, 13.3%) than in CT 11,36.7% and the difference was statistically significant (p=0.03). Overall complications have been reported as 6-12% in literature.^{9,13} PDT is considered to be safe procedure in comparison to CT. Many authors even suggest that the complications and clinical outcomes are not of statistical difference in between trainee and experienced surgeon or intensivist. PDT can also be easily picked up by physicians and intensivists working in ICU and well versed with vascular access using Seldinger technique and also be performed bedside.¹⁵⁻¹⁷ In our series

all the PDTs and CT were performed by consultant ENT surgeons or neurosurgeons and all the PDTs were done in operation theatre as we could have an anesthesiologist taking care of the ET tube and act promptly in case there was any untoward incident of ET tube dislodgement and desaturation during the procedure.

Intraoperative and post-operative major hemorrhage was seen in 5 (16.5%) cases each in CT group where as it was seen in 1 (3.7%) case and 2 (6.7%) cases respectively in PDT group however there was no statistical significant difference. Similarly Intraoperative and post-operative minor hemorrhage was seen in 5 (16.5%) cases and 1 (3.3%) case respectively in CT group whereas only 2 cases of post-operative major hemorrhage was seen in PDT group and the difference was not statistically significant. There was no case of minor post-operative hemorrhage seen in PDT group. The incidences of hemorrhages in CT has been reported up to (3-37%) and is very variable due to the incision and dissection of pretracheal tissue, retraction or division of the isthmus and proximity of the vessels supplying thyroid lying in close proximity to the pre tracheal tissues. PDT on the other hand has been reported to have lesser incidences of hemorrhage mostly owing to small incision, avoiding surrounding vessels if properly planned and done and any small amount of ooze is easily tamponated by the snugly fitted tracheostomy tube and the small incision. Kwon J et al reported minor bleed in CT as 7.0% and in PDT as 4.9%. Similarly they observed moderate to major bleeding in CT as 8.8% and PDT as 1.6 %. Though the incidences of bleeding was less in PDT group, the difference was not statistically significant.¹³ Silvester W et al also reported no significant difference in between minor or moderate to severe bleeding in between the two groups.¹⁴

There are evidences of lower incidence of stomal or surgical site infection (SSI) in case of PDT. Our study also shows slightly lower incidences of SSI in PDT group (6.7%) in comparison to CT group (10%) although the difference was not significant statistically. Kwon J et al have observed 1.8% wound infection within 7 days in CT group whereas no infection was reported in PDT group although there was no statistical difference in between the groups.¹³

Youssef et al in their study reported 68.5% mild to severe stomal infection in CT group and 12.5 % in PDT group with a statistical significant lower rate of infection in PDT group.¹⁸ A small incision and minimal tissue damage may be the reason of lower stomal infection in PDT group.

Intraoperative desaturation was seen in one case of CT group which was because of false track insertion of tracheostomy tube however no untoward incident encountered. False track was encountered in 3 (10%) cases of CT group and 1 (3.3%) case of PDT group. The false track encountered in both group were pretracheal and could be rectified without any untoward incident. Postoperative accidental decanulation was seen in 3(10%) cases of CT group vs 1 (3.3%) cases of PDT group. No cases of major complications like procedure related death, posterior tracheal puncture in PDT leading to subcutaneous emphysema, pneumothorax or esophageal puncture was seen in our series.

Complications in PDT can be further reduced with increasing experience of the operating surgeon as well as use of preoperative ultrasound to rule out any abnormal course of vessels at the site of cannula puncture as well as enlarged thyroid lobes or the isthmus or any neck masses.^{19,20} Use of fiberoptic bronchoscopy can be a useful tool to avoid complications like injury to posterior tracheal wall and esophagus during needle insertion. It might also be useful in teaching and supervision of beginners. However fiberoptic bronchoscope might not be available in all institute especially in developing institute. The free movement of guidewire before each step is considered as prerequisite before proceeding. In our series we did not use fiberoptic bronchoscope but did not encounter any difficulty in completion of PDT and had no cases of conversion to CT.^{19,21-23}

CONCLUSION

Percutaneous dilatation tracheostomy is equally safe and effective as conventional tracheostomy but with lower incidence of overall complications and faster to perform. Intra and post-operative hemorrhages and infections though statistically insignificant but are seen lesser with percutaneous dilatation tracheostomy. It can be a better option in critical care setup where tracheostomy is required and can be performed bedside and even by intensivists and anesthesiologists.

REFERENCES

- Turkmen A, Altan A, Turgut N, Yildirim G, Ersoy A, Koksak C, et al. Comparison of percutaneous dilatational tracheostomy with surgical tracheostomy. *M E J Anesth*. 2008;19(5):1055-1067.
- Ciaglia P, Firsching R and Syniec C. Elective percutaneous dilatational tracheostomy. A new simple bedside procedure; preliminary report. *Chest*. 1985;87(6):715-719. <https://doi.org/10.1378/chest.87.6.715>
- Griggs WM, Worthley LI, Gilligan JE, Thomas PD and Myburg JA. A simple percutaneous tracheostomy technique. *Surg Gynecol Obstet*. 1990;170(6):543-545.
- Toye FJ and Weinstein JD. A percutaneous tracheostomy device. *Surgery* 1969; 65:384-389.
- Schachner A, Ovil Y, Sidi J, Rogev M, Heilbronn Y and Levy MJ. Percutaneous tracheostomy-A new method. *Crit Care Med* 1989; 17:1052-1056. <https://doi.org/10.1097/00003246-198910000-00017>
- Fantoni A and Ripamonti D. A non-derivative, non-surgical tracheostomy: The translaryngeal method. *Intensive Care Med* 1997; 23:386-392. <https://doi.org/10.1007/s001340050345>
- Frova G and Quintel M. A new simple method for percutaneous tracheostomy: Controlled rotating dilation. A preliminary report. *Intensive Care Med* 2002; 28:299-303. <https://doi.org/10.1007/s00134-002-1218-5>
- Friedman Y, Fildes J, Mizock B, Samuel J, Patel S, Appavu S, et al. Comparison of percutaneous and surgical tracheostomies. *Chest* 1996;110(2):480-485. <https://doi.org/10.1378/chest.110.2.480>
- Melloni G, Muttini S, Gallioli G, Carretta A, Cozzi S, Gemma M, et al. Surgical tracheostomy versus percutaneous dilatational tracheostomy. A prospective-randomized study with long-term follow-up. *J Cardiovasc Surg*. 2002; 43(1):113-121.
- Rai S, Sharma P, Makajoo S, Karmacharya B and Yogi N. Early versus late tracheostomy in outcome of patients admitted in neurosurgical intensive care unit. *Eastern Green Neurosurgery* 2020; 2(2):21-5. <https://doi.org/10.3126/egn.v2i2.29239>
- Ambesh SP, Pandey CK, Srivastava S, Agarwal A and Singh DK. Percutaneous tracheostomy with single dilatation technique: A prospective, randomized comparison of Ciaglia Blue Rhino versus Griggs' guidewire dilating forceps. *Anesth Analg*. 2002; 95:1739-1745. <https://doi.org/10.1097/00000539-200212000-00050>
- Westphal K, Maeser D, Scheiffler G and Lischke V. Percutist: A new single-dilator technique for percutaneous tracheostomy. *Anesth Analg*. 2003;96:229-232. <https://doi.org/10.1213/00000539-200301000-00046>
- Kwon J, Kim YO and Ryu JA. Safety and feasibility of percutaneous dilatational tracheostomy performed by a neurointensivist compared with conventional surgical tracheostomy in neurosurgery intensive care unit. *J Neurointensive Care*. 2019;2(2):64-69. <https://doi.org/10.32587/jnic.2019.00213>
- Silvester W, Goldsmith D, Uchino S, Bellomo R, Knight S, Seevanayagam S, et al. Percutaneous versus surgical tracheostomy: a randomized controlled study with long-term follow-up. *Crit Care Med*. 2006;34(8):2145-2152. <https://doi.org/10.1097/01.CCM.0000229882.09677.FD>
- Lee D, Chung CR, Park SB, Ryu J-A, Cho J, Yang JH, et al. Safety and feasibility of percutaneous dilatational tracheostomy performed by intensive care trainee. *Korean J Crit Care Med*. 2014;29:64-69. <https://doi.org/10.4266/kjccm.2014.29.2.64>
- Seder DB, Lee K, Rahman C, Rossan-Raghunath N,

- Fernandez L, Rincon F, et al. Safety and feasibility of percutaneous tracheostomy performed by neurointensivists. *Neurocrit Care*. 2009; 10:264-268.
<https://doi.org/10.1007/s12028-008-9174-8>
17. Yoo H, Lim SY, Park C-M, Suh GY and Jeon K. Safety and feasibility of percutaneous tracheostomy performed by medical intensivists. *Korean J Crit Care Med* 2011; 26:261-266.
<https://doi.org/10.4266/kjccm.2011.26.4.261>
 18. Youssef TF, Ahmed MR and Saber A. Percutaneous dilatational versus conventional surgical tracheostomy in intensive care patients. *North Am J Med Sci* 2011; 3:508-512.
<https://doi.org/10.4297/najms.2011.3508>
 19. Kost KM. Endoscopic percutaneous dilatational tracheotomy: a prospective evaluation of 500 consecutive cases. *Laryngoscope*. 2005; 115:1-30.
<https://doi.org/10.1097/01.MLG.0000163744.89688.E8>
 20. Flint AC, Midde R, Rao VA, Lasman TE and Ho PT. Bedside ultrasound screening for pretracheal vascular structures may minimize the risks of percutaneous dilatational tracheostomy. *Neurocrit Care*. 2009; 11:372-376.
<https://doi.org/10.1007/s12028-009-9259-z>
 21. Durbin CG. Techniques for performing tracheostomy. *Respir Care*. 2005;50:488-496.
 22. Polderman KH, Spijkstra JJ, deBree R, Christiaans HM, Gelissen HP, Wester JP, et al. Percutaneous dilatational tracheostomy in the ICU: optimal organization, low complication rates and a description of a new complication. *Chest*. 2003; 123:1595-1602.
<https://doi.org/10.1378/chest.123.5.1595>
 23. Karimpour HA, Vafaii K, Chalechale M, Mohammadi S and Kavianezhad R. Percutaneous dilatational tracheostomy via Griggs technique. *Arch Iran Med*. 2017; 20(1): 49 - 54.

Authors Contribution:

SR-Concept and design of the study; interpreted the results, prepared first draft of manuscript and critical revision of the manuscript and coordination of overall study; **SB, PB**- Performed Literature search, data acquisition; manuscript editing and review; **KPK**- Design of the study, interpreted results and preparation and revision of the manuscript; **BK**- Concept and design of the study, manuscript editing; **NY**- Concept, Design, statistical analysis, literature search and manuscript editing.

Orcid ID:

Dr. Shiwani Rai - <https://orcid.org/0000-0003-4216-5332>
 Dr. Suman Adhikari - <https://orcid.org/0000-0003-1475-9985>
 Dr. Prabin Bhandari - <https://orcid.org/0000-0001-6111-4261>
 Dr. Krishna Prasad Koirala - <https://orcid.org/0000-0002-6045-7446>
 Dr. Balgopal Karmacharya - <https://orcid.org/0000-0002-6131-3516>
 Dr. Nikunja Yogi - <https://orcid.org/0000-0002-0949-6159>

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