Lockdown Innovation –SAMBU – Through the wild eyes and by the disciplined mind of an anaesthesia resident

Sir,

Innovations in health care are costly and time-consuming. In addition to that, India being a developing country, has limited financial resources. The scope of postgraduation in anaesthesiology is so abundant that the residents can use their wild minds and disciplined eyes to create life-saving yet cost-effective devices. Some of the new ideas designed to minimise aerosol generation during the corona virus disease-19 (COVID-19) era included aerosol boxes,[1,2] corona curtains,[3] railway coaches transformed into COVID-19 care centres,[4] face shields made out of transparent over-head projector display foil, bacterial/viral filters attached to an anaesthesia face mask and many more.[5]

During the final year of my postgraduation, I made a no-cost manual resuscitator by the name 'SAMBU – Sathya's artificial manual breathing unit ' from an empty intravenous fluid bottle. The materials required were one intravenous fluid plastic bottle (1 L bottle for adults and 500 mL for children, one right-angled connector and two syringe caps). The bottle being compliant, recoiled easily with oxygen or even room air. A round incision was made on the hanging side of the bottle along the inner diameter of the hook, and a circular opening was created. A right-angled connector was inserted in the opening which fitted snuggly with no air leak. One syringe cap was inserted onto the nozzle of the injection port through which oxygen tubing from the flow metre or room air can enter and one more syringe cap was inserted as a side vent for carbon dioxide [Figure 1].

'SAMBU' can be used in situations like in a remote healthcare facility where there is no/limited availability of the AMBU and it is being required by more than one patient or during travel for unanticipated emergencies requiring resuscitation. It can be used to generate positive-pressure ventilation temporarily till a definite solution arises. My experience with SAMBU involved its testing in test lungs and also in mannequins. To

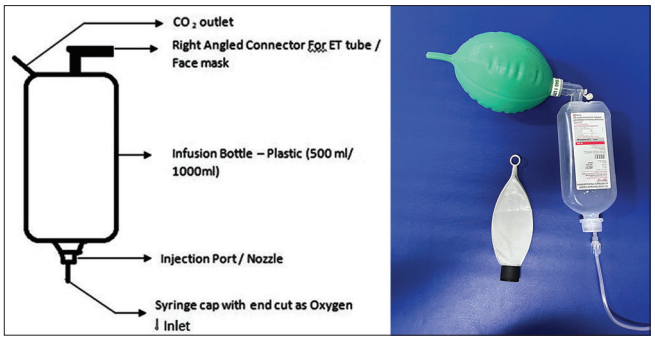

Figure 1: 'SAMBU' –Outline design and equipment. ET: endotracheal; CO_2: carbon dioxide

date, there have been no instances in real life which required the use of the 'SAMBU' in a living patient. Efforts are being made for filing the patent rights of 'SAMBU'.

The shortcomings of this device are that most of the intravenous fluid bottles come in a volume of 500 ml and deliver less than the required tidal volume in adults, whereas an intravenous bottle of a capacity of 1 L or more for manual resuscitation is required for making the 'SAMBU'. Manual resuscitators in general carry a high risk of aerosol generation if used in COVID-19 patients with unprotected airways.[6] The 'SAMBU' can also be a lifesaver in emergency situations like ventilating patients with a cricothyroidotomy. Nevertheless, as the famous saying goes, 'Necessity is the mother of invention', the COVID-19 pandemic has encouraged doctors to create innovative ideas to meet their needs. Innovations are the cornerstones in the amelioration of anaesthesia practice including the improvement of patient safety and outcomes.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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Submitted: 23-May-2022
Revised: 31-Oct-2022
Accepted: 02-Nov-2022
Published: 18-Nov-2022

REFERENCES

1. Venketeswaran MV, Srinivasaraghavan N, Balakrishnan K, Seshadri RA, Sriman S. Intubation outcomes using the aerosol box during the COVID-19 pandemic: A prospective, observational study. Indian J Anaesth 2021;65:221-8.
2. Puthenveettil N, Rahman S, Vijayaraghavan S, Suresh S, Kadapamannil D, Paul J. Comparison of aerosol box intubation with C-MAC video laryngoscope and direct laryngoscopy—A randomised controlled trial. Indian J Anaesth 2021;65:133-8.
3. Bani Hani D, Altal O, Aleshawi A, Alhowary A, Obeidat B. Expanding access for COVID-19 patients by transforming a burn unit into a closed-circuit unit for surgical patients: Experience from an academic medical center in Jordan. Patient Saf Surg 2020;14:25.
4. Patel CK, Selvam VK, Sahu DK. Railway anaesthesiologists and Indian railway COVID-19 management system. Indian J Anaesth 2020;64:S132-5.
5. Suresh V. Simple innovations in the operating room amid the COVID-19 pandemic. Indian J Anaesth 2020;64:S146-7.
6. Walsh EC, Kwo J, Chang MG, Pino RM, Bittner EA. Rapid expansion of the airway response team to meet the needs of the COVID-19 pandemic. J Healthc Qual 2021;43:275-83.

Access this article online	
Quick response code	Website: www.ijaweb.org
	DOI: 10.4103/ija.ija_447_22

How to cite this article: Narayanan KS, Ganesan I, Bhandari G, Shahi KS. Lockdown Innovation - SAMBU - Through the wild eyes and by the disciplined mind of an anaesthesia resident. Indian J Anaesth 2022;66:806-7.