Use of Venturi to prevent desaturation during nebulization

Sir,

Nebulization is the delivery of saline or drugs in the form of small droplets to the distal lung, which is a common practice in intensive care unit (ICU).[1] It is done with the help of nebulizers which are connected to the inspiratory limb of breathing circuit either in mechanically or spontaneously ventilated patients. Spontaneously breathing patients who are admitted in ICU also need oxygen supplementation. Nebulization in such patients needs attention with careful monitoring of vitals, airway pressure, and oxygen saturation to prevent any desaturation or other adverse events.[2] During conventional nebulization, even with oxygen flow rate of 6–8 L/min, there is a fall in oxygen saturation. In some cases, if not corrected, it may lead to severe hypoxemia and hemodynamic instability. Therefore, we introduce a noble technique using a Venturi to prevent such events. Venturi is considered a high-flow oxygen therapy device. The final assembly with Venturi is shown in Figure 1. It is connected between the nebulizer and the oxygen source. Different types of Venturi device (color coded) can be used according to the need. The assembly increases the flow, which helps in the delivery of high FiO_2 preventing desaturation.

In literature, there are numerous other advantages of high-flow therapy. Venturi is commonly used in the hospital setting to deliver controlled percentages of oxygen.[3] During acute distress, the ventilatory demand increases to 30 L/min to 120 L/min. Normal quite breathing inspiratory flow is 15 L/min. Venturi nebulizer creates inspiratory flow of 60 L/min. By increasing inspiratory flow demand, it also gives a subjective feeling of satisfaction with an objective decrease in tachypnea and thereby improves saturation.[4] As it is a high-flow delivery device, it creates positive pressure in nasopharynx which could act like positive end expirarory pressure (PEEP) to prevent alveolar collapse at the end of expiration. Hence, it helps improve ventilation and perfusion ratio, minimizing shunting.[5]

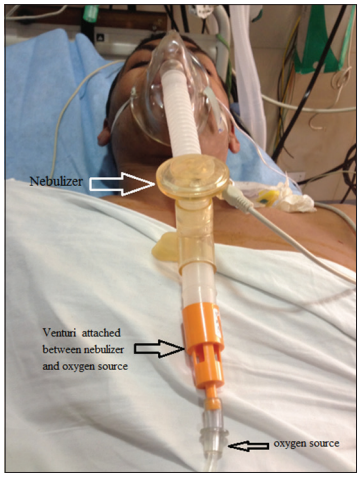

Figure 1: Venturi–nebulizer assembly; Venturi is attached between the nebulizer apparatus and oxygen source

CONCLUSION

In ICU settings, patients are oxygen dependent due to intrinsic lung pathology or because of weakness in respiratory musculature. Many a time, desaturation may lead to suboptimal respiratory care and premature cessation of nebulization. This technique of using Venturi system with nebulization effectively takes care of the desaturation and improves care in ICU.

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Conflicts of interest

There are no conflicts of interest.

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