Case Report

Unusual pericuff leak around proseal-laryngeal mask airway corrected by clamping gastric drain port: A case report

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ABSTRACT

ProSeal™-Laryngeal Mask Airway (PLMA) (Laryngeal Mask Company, Henley-on Thames, UK) is commonly used for securing the airway with an added advantage over classic LMA as its gastric drain tube allows the insertion of Ryle's tube and suctioning of gastric contents. The ProSeal LMA is designed in such a way that it allows controlled mechanical ventilation. During controlled mechanical ventilation, air leaks can occur because of positive airway pressures. Air leaks from the gastric drain port are almost always due to the malposition of PLMA. Here, we report a case of air leak from gastric drain port despite correctly placed PLMA and its successful management without removing the device.

Key words: Air leak, Laryngeal mask airway, Pericuff leak, ProSeal laryngeal mask airway

ProSeal™-Laryngeal Mask Airway (PLMA) (Laryngeal Mask Company, Henley-on Thames, UK) is a second-generation airway device with a double cuff to improve its seal and gastric drain port for the insertion of Ryle's tube and suctioning of gastric contents. PLMA is preferred over classic LMA (CLMA) as it can safely allow positive pressure ventilation up to 30–40 cm H_2O [1,2]. The use of PLMA during mechanical ventilation is not always without complications. Aspiration of air from the esophagus, gastric distension, and airway obstruction are the problems frequently associated with the use of PLMA [3,4]. The most common cause of air leak from gastric drain port is malposition of PLMA which is usually managed by removing the PLMA and reinserting it back or using an alternative device for airway management [5].

To the best of our knowledge, there is no published case report of air leak from gastric drain port despite correctly placed PLMA and its management without removing the device. Hence, we are reporting a case of unusual pericuff leak around ProSeal LMA which was successfully managed without removing the LMA.

CASE REPORT

A 45-year-old female weighing 58 kg with a body mass index of 29 and American Society of Anesthesiologist (ASA) Grade I was posted for Modified Radical Mastectomy of the left side.

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On examination, his pre-operative vitals were: Heart rate 86/min, blood pressure 124/72 mmHg, temperature 97.6°F, respiratory rate 16/min, and SpO_2 99% on room air. Airway examination was normal with Mallampatii Grade I.

The patient was induced with intravenous (IV) fentanyl 100 mcg and 110 mg of propofol and muscle relaxation was achieved with 25 mg of atracurium under all standard ASA monitoring. After bag and mask ventilation for 3 min, size #3 PLMA was placed using recommended insertion technique. The suction catheter was inserted through a gastric drain tube of PLMA without any resistance. Adequate chest rise and smooth capnograph tracing confirmed correct placement of PLMA. The patient was then placed on mechanical ventilation with pressure-controlled ventilation mode (Target inspiratory pressure= 17 cm H_2O, I: E ratio 1:2, Fio_2 50%, and Respiratory rate of 12). Anesthesia was maintained on isoflurane and nitrous oxide and surgery was started.

After 30 min, the patient's expired tidal volume decreased with a significant leak (259 mL), noticed in the ventilation panel (Fig. 1). However, the capnograph configuration was well maintained with compensatory increased inspiratory tidal volume. PLMA was manipulated by increasing or decreasing the depth of insertion, flexion of the neck, re-inflation of cuff with more air than previous, but it did not work. Hence, we decided to reinsert the PLMA after requesting the surgeon to wait till we secure the airway. We could place the PLMA with ease and there

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was adequate chest expansion with a capnograph. After 5 min, a similar leak was observed in the monitor although the capnograph was maintained and there was increased inspiratory tidal volume with the same set inspiratory pressure.

While manipulating the PLMA, we heard an air leak sound from the drain tube, which we missed previously. We clamped the gastric tube with the suction catheter in situ and we observed the air leak significantly decreased after that (Fig. 2). We did a fiber-optic examination of the airway tube to confirm the position of PLMA and we noticed its distal tip behind the cricoids cartilage and a good glottis view (Fig. 3). We also examined the drain tube and esophageal lumen was visible. We proceeded with surgery while clamping the drain tube, as there was no gastric distension or obstruction. The surgery was successfully completed in the next 45 min. The patient was reversed of residual muscle relaxation with IV neostigmine and glycopyrrolate, and PLMA was removed when the patient was fully awake.

DISCUSSION

Airway management during anesthesia for surgery is a challenging task for the anesthesiologist. Traditionally, tracheal intubation is considered the gold standard for airway protection and mechanical ventilation during surgical procedures. Although tracheal intubation is used for definitive airway management, it is not without risk and can lead to various complications including airway injury, failure to intubate, and hemodynamic instability. LMA on the other hand is a preferred airway device for short-duration surgeries as it is easy to introduce, has a lower risk of airway injury, and less hemodynamic changes during insertion [6,7].

PLMA is a second-generation supraglottic airway device used frequently for spontaneous and controlled ventilation during general anesthesia. Difficult airway guidelines also recommend the use of second-generation supraglottic airway devices during failed tracheal intubation [8]. Although it is considered advanced as compared to CLMA, it also has some unique problems such as esophageal aspiration of air, gastric distension, and even complete obstruction of the airway despite best positioned LMA by a well-experienced anesthesiologist [4]. These issues can be managed with a proper patient and procedure selection, adequate depth of anesthesia, and early recognition and management of malposition.

A common cause of air leak is malposition of LMA which is usually managed by removing the LMA and re-inserting it. If air leak still persists then it is advised to use either an alternative airway management technique or endotracheal intubation. In our case, when the leak persisted after re-insertion, we performed fiberoptic bronchoscopic examination to confirm the correct position of the PLMA. Air leak through gastric drain tube is reported even in well-placed PLMA, which leads to loss of tidal volume during controlled mechanical ventilation [3]. In our case, there was no folding of the distal tip as we could negotiate the suction catheter successfully, and also we were able to generate

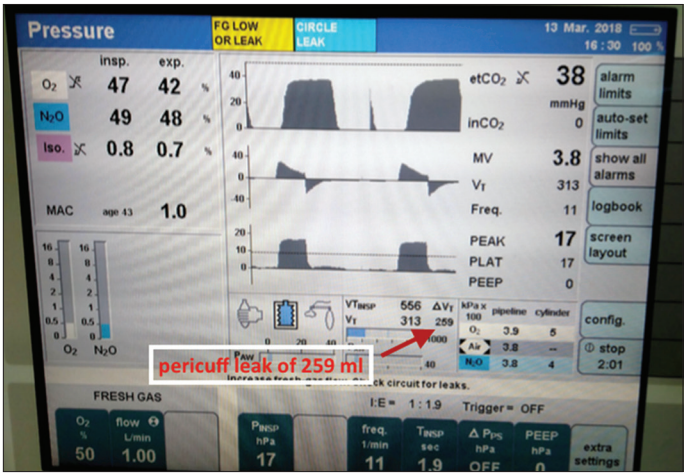

Figure 1: Ventilation panel showing pericuff leak of 259 mL with pressure controlled ventilation, inspiratory pressure - 17 cm H_2O

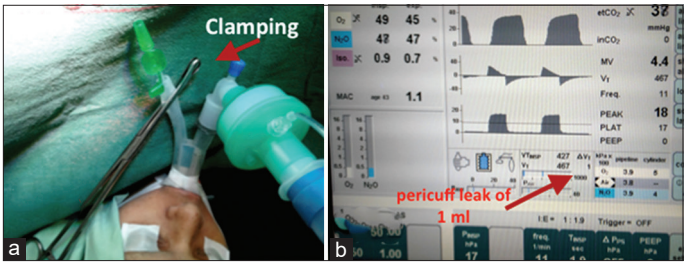

Figure 2: (a) Clamping of gastric channel with suction catheter in situ; (b) ventilation panel showing decreased leak to 1 mL after clamping

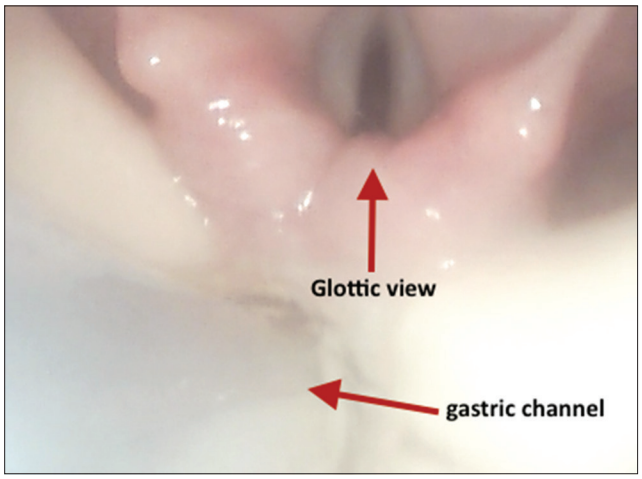

Figure 3: Fiberoptic view through the ventilation port of PLMA showing the glottis

maximum minute ventilation of more than 12 L/min. Hence, we did not remove the PLMA a 2nd time and decided to proceed with the surgery after clamping the gastric channel.

CONCLUSION

To the best of our knowledge, this is the first case report which sensitizes the anesthesiologist to the fact that the use of well-placed PLMA during controlled mechanical ventilation may lead

to pericuff air leak. Removing and reinserting the PLMA may not be useful in that case and the surgery can be safely performed by just clamping the gastric drain port.

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