



Unexpected APL Valve Failure During Bag Mask Ventilation

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Case Report

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Abstract

The anaesthesia workstation is always thoroughly checked prior to any patient undergoing anaesthesia as a part of mandatory protocol. Even after proper checking and confirming no leak of the machine, there are chances of unpredictable failure of machine causing complications. We are describing a case report where the unpredicted failure of APL valve resulted in a disastrous situation leading to ventilator failure during anaesthesia.

Keywords: Anaesthesia Workstation; APL Valve; Failure of Ventilation

Introduction

The speciality anaesthesiology deals with the maintenance of vital parameters throughout the surgery and it starts from the bag and mask ventilation by hand. Any failure in the initial phase of artificial ventilation can lead to a chaotic situation where the maintenance of cardiorespiratory function can be troublesome.

Body of Paper

A 32 year old male patient was scheduled for percutaneous nephrolithotomy for which general anaesthesia was planned. The anaesthesia machine (GE 600) has self-test mode to identify any kind of leak. The leak check was done and it was less than 30 mL. The patient was taken to the operation theatre, all necessary monitors were attached and preoxygenation was started. After induction when we tried to mask ventilate the patient by keeping the Adjustable Pressure Limiting (APL) valve at 25 mm H₂O, the bag didn't refill as expected. It was assumed that might be there is any leak by improper mask holding, so mask was held by both the hands and again mask ventilation was tried, but still we couldn't ventilate. The mask size was changed

quickly, an oral airway was inserted to maintain a proper airway and the APL valve was further closed gradually up to 70 cm H₂O but all in vain. There was no bag refill and we were not able to mask ventilate. We also tried oxygen flush for quick refill of the bag and ventilated somehow to maintain the saturation. Assuming that there was some unexplained defect in the closed circuit system, we attached a Bain's circuit in the auxiliary oxygen port and tried to ventilate which was successful. We continued the mask ventilation for some time to maintain the oxygenation upto regaining the consciousness of the patient. The case was postponed due to the unknown problem of the anaesthesia workstation.

The method of providing anaesthesia always have chances of facing unpredictable complications in any point. It may be either in the workstation, gas pipeline, electricity supply etc. Previously many anaesthesiologists have encountered failure of APL valve and mentioned about it. In some cases tubing such as CO₂ sampling line or temperature monitoring line is been gripped in between the valve and the base which led to failure in rotation of APL valve. 1,2. Some cases have been reported with accidental detachment of the APL valve from its base. 3. This case we encountered a unique problem as there was no sampling line gripping, no

detachment or any difficulty in rotating the APL valve. The APL valve was rotating to its full extent but there was still full leakage of the gas. There was some intrinsic defect inside the APL valve for which it was rotating but it was not closing the valve resulting in leakage of gas. As the self-test done by the anaesthesia machine doesn't involve the APL valve, it was not checked and such event occurred.

Conclusion

It is important to understand that without any occlusion of any kind of object/sampling line in the APL valve, still failure is possible due to internal defects which may not be evident externally or during self-test of workstation. Due to timely intervention, we successfully maintained the bag mask ventilation and oxygen saturation, so back up equipment for emergency such as Bain's circuit; Ambu Bag etc. should

always be ready to tackle such situation.

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