ICU MANAGEMENT & PRACTICE

Volume 16 - Issue 2, 2016 - Cover Story

Treating Complications from Abdominal Surgery

Dr. Roberto Oggioni
******@***uslcentro.toscana.it

Director - Department of Anaesthesia and Intensive Care, S. Giovanni di Dio Hospital, Florence Health Authority, Florence, Italy

Dr. Margherita Labardi
******@***uslcentro.toscana.it

Anaesthetist and Intensivist - Department of Anaesthesia and Intensive Care, S. Giovanni di Dio Hospital, Florence Health Authority, Florence, Italy

Case Report Using Nonbronchoscopic BAL

Use of the HALYARD* Mini-BAL Sampling Catheter proved invaluable in the case of a patient experiencing complications from abdominal surgery. Dr. Roberto Oggioni has been director of the Department of Anaesthesia and Intensive Care at S. Giovanni di Dio Hospital since 2012, and wrote up the case with colleague Dr. Margherita Labardi for *ICU Management & Practice*.

Case Report from March 2014

Patient FN, aged 74 years, gender ♂

The patient was admitted to the emergency department for abdominal pain of a few days' duration. An abdominal CT scan was performed, showing marked pleural effusion of density similar to water collected from the left middlebasal area, associated with secondary atelectasis.

A lumbar hernia with intestinal loop involvement was observed in the area of the painful periumbilical swelling, associated with an extensive area of increased density of the adjacent subcutaneous adipose tissue. Immediately below this there was a further area of intestinal loop herniation, not associated with documentable CT signs of inflammation. After surgical evaluation, the patient was transferred to the operating theatre (OT) and underwent intestinal resection and intra-abdominal VAC (Vacuum-Assisted Closure® KCI, Houten, The Netherlands) therapy.

After the procedure the patient was transferred to intensive care sedated and intubated for monitoring and treatment. The following samples were taken for culture tests on admission: bronchial aspirate, blood cultures, urine culture, and nasal and rectal swabs. The patient was haemodynamically autonomous, without the need for vasoactives. Empirical antibiotic therapy was started with piperacillin-tazobactam and metronidazole owing to peritonitis.

The patient was kept intubated over the following days in anticipation of abdominal revision surgery.

Six days later he was transferred back to the operating theatre for second-look surgery.

On that date the bronchial lavage (BAL) collected by HALYARD* Mini-BAL Sampling Catheter (Halyard Health, Zaventem, Belgium), a protected, blinded telescoping catheter (cutoff 104), was negative.

The second procedure comprised a revision of the previous ileo-ileal anastomosis, appendectomy, and closure of the abdominal wall by a "Posterior component separation" technique; a biological prosthesis was introduced under the rectus muscle bellies.

The patient returned from the OT sedated and intubated, with pressure-controlled ventilation. Monitoring was started of intra-abdominal pressure (IAP).

The patient recovered his gastrointestinal motility on the third day. He was extubated on the fourth day. Noninvasive ventilatory assistance was continued for the next few days. Of note on the eighth postoperative day was a CT scan of the chest and abdomen, which documented abundant left pleural effusion with atelectasis of the adjacent pulmonary parenchyma, associated with slight effusion on the right. In the abdomen non-homogeneity was observed of the subcutaneous tissue below the xyphopubic wound with an oedematous-saturated appearance of the muscle layer in front of the abdominal prosthesis, where air bubbles were visible. No surgical indications were determined.

On the tenth postoperative day there was an episode of high frequency AF concomitant concomitantly with a fever spike, electrically cardioverted with sinus rhythm recovery.

On the fifteenth postoperative day the patient developed signs of respiratory failure with the need for orotracheal reintubation, probably related to right middle-basal bronchopneumonia; the empirical antibiotic therapy was then altered to linezolid, meropenem and fluconazole. The bronchopulmonary disorder was confirmed by a CT scan, which also showed suspected dehiscence of the surgical wound.

After reintubation, bronchoaspiration and a new BAL (HALYARD* Mini-BAL Sampling Catheter) were carried out. In the meantime the patient developed signs of severe sepsis due to pneumonia and surgical wound infection. A thoracocentesis performed was negative.

The BAL sample collected by HALYARD* Mini-BAL Sampling Catheter demonstrated the presence of *Klebsiella pneumoniae* while the tracheal aspirate proved to be negative. While awaiting the antibiotic sensitivity test result, antibiotic therapy was altered to tigecycline and meropenem. However, as the bacterium proved to be multisusceptible, de-escalation was then carried out leaving only fluconazole and meropenem.

During the subsequent 48 hours the patient needed a new infusion of vasoactive drugs and muscle relaxation to allow adequate ventilation and oxygenation. The patient also presented with hyperthermia for which he was cooled by physical means. A new bronchial aspirate sample was taken, which proved negative.

On the 23rd postoperative day, the patient underwent percutaneous tracheostomy according to the Fantoni technique.

Over the next few days the signs of septic shock showed an improvement, with a progressive reduction in vasoactive support, and negative procalcitonin.

On the 26th postoperative day, vasoactive support and antibiotic therapy were discontinued, after a negative bronchial aspirate sample response. The patient then had a rectal swab showing KPC *Klebsiella pneumoniae* colonisation.

Unfortunately an episode of haematuria further complicated the postoperative course, and a three-way catheter had to be introduced with continuous bladder irrigation.

One month and ten days after the second operation, the tracheostomy cannula was removed, after a weaning period lasting approximately one week.

After one month and 18 days, the patient was transferred from intensive care to the medical ward; KPC *Klebsiella* colonisation was present in a rectal swab, not treated.

Conclusion

Bronchoalveolar lavage (BAL) using bronchoscopy is an accurate and reproducible method for the evaluation of suspected ventilator-associated pneumonia (VAP). However, bronchoscopy is an invasive technique that needs the continuous availability of a skilled physician.

The HALYARD* Mini-BAL Sampling Catheter,a telescoping catheter, permits healthcare staff to carry out a BAL without using broncoschopy. This device offers several advantages in comparison with invasive techniques: it can be performed directly at the bedside by an ICU nurse in a few minutes; it is protected inside another catheter to avoid bacterial contamination during the injection and aspiration; and it has a turning end to insert into the right or left main bronchus without disconnecting the patient from mechanical ventilation. Moreover what makes it distinctive is its ease of performance coupled with the major sensitivity of BAL (104 cfu) versus tracheal aspirate (>105 cfu). Thus this makes this, in case of a positive result, potentially reliable in the aim to ameliorate the sometimes difficult diagnosis of VAP and to start prompt and adequate targeted antibiotic therapy. This was the main difference in diagnosis and treatment concerning this patient in whom tracheal aspirate was negative.

When you suspect ventilator-associated pneumonia HALYARD* Mini-BAL Sampling Catheter makes more sense than tracheal aspirate, because it is quick, easy to perform, protected and less invasive than bronchoscopy. Although it is relatively costly compared to tracheal aspirate it has to be balanced against nursing time for sterilisation etc., service maintenance and any difficulties.

We have now added HALYARD* Mini-BAL Sampling Catheter in our VAP bundle strategy, as follows:

1. Daily assessment of sedation
2. Endotracheal tube with subglottic aspiration
3. Closed circuit aspiration
4. Oral hygiene with chlorexidine
5. Head of bed-elevated 30-45°
6. This strategy is carried out in all ICU patients after 72 hrs of mechanical ventilation.

Abbreviations
AF atrial fibrillation
BAL bronchoalveolar lavage
CFU colony forming unit
CT computed tomography
IAP intra-abdominal pressure
OT operating theatre
PTCA percutaneous transluminal coronary angioplasty
VAC vacuum-assisted closure
VAP ventilator-associated pneumonia

Published on : Mon, 30 May 2016