Critical Rounds
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Critical Rounds Newsletter
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Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you **"Critical Rounds Newsletter"** which contain latest and interesting news in the field of Critical Care .

This issue contains :

1. A descriptive analysis of the Eurobact II study reveals different bloodstream infection epidemiology in critically ill COVID-19 patients compared to non-COVID-19 patients.

2. Prospective Randomized Controlled Study on Comparison of Chest Tube Insertion Site Dressings

3. Assessment of the Relationships Between Platelet Count, Mean Platelet Volume, and Platelet Transfusion with Intraventricular Hemorrhage and Mortality in Preterm Infants

4. Management of persistent air leak in a mechanically ventilated patient with endobronchial fibrin sealant and autologous blood patch: A Case Report

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Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Limited

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1.A descriptive analysis of the Eurobact II study reveals different bloodstream infection epidemiology in critically ill COVID-19 patients compared to non-COVID-19 patients.

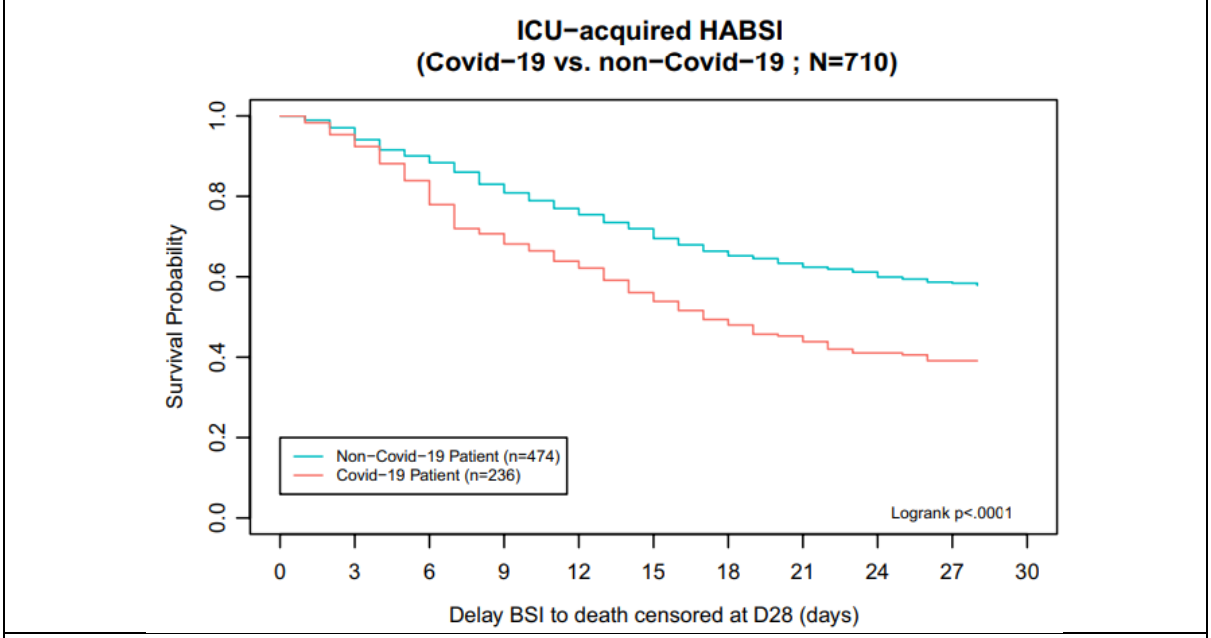
Introduction:

Critically ill patients frequently experience hospital-acquired bloodstream infections (HABSI), which are more common and are linked to higher morbidity and mortality.[1] The COVID19 illness, which was brought on by the SARSCoV-2 virus that caused severe acute respiratory syndrome, caused millions of deaths globally in 2019.[2] Critically ill SARS-CoV-2 infected patients were more likely to get hospital acquired infections, particularly bloodstream infections, for unknown reasons (BSIs).[3] The study's main goal was to compare critically ill patients with and without COVID-19 to describe the epidemiology and outcomes of hospital-acquired bloodstream infections (HABSIs).

Patients with COVID-19 and patients without COVID-19 have different hospital-acquired bloodstream infections (HABSI) epidemiologies.

Methods:

The Eurobact II study, a prospective observational multicontinental cohort study on HABSI treated in ICU, provided the data that reasearchers used. Researchers chose hospitals that treated critically ill COVID-19 and non-COVID-19 patients for the current investigation. In order to compare COVID-19 and non-COVID-19 in terms of patient characteristics, infection source, and microbiological distribution, descriptive statistics were used. Using multivariable fragility Cox models, researchers investigated the relationship between COVID-19 status and mortality.



Survival curve for ICU−acquired HABSI

Results:

A total of 53 centres, representing 19 nations on 5 continents, qualified. Overall, 829 patients (64.9%) who were male and had a median age of 65 years (IQR: 55 to 74) received treatment for a HABSI. Patients who were included were 252 COVID19 patients (30.4%) and 577 non-COVID-19 patients (69.6%). From the two groups, the period between hospital admission and HABSI was comparable. Patients with COVID-19 had higher rates of respiratory sources (40.1 vs. 26.0%, p0.0001) and main HABSI (25.4% vs. 17.2%, p=0.006). Acinetobacter spp. (18.8% vs. 13.6%) and enterococcal (20.5% vs. 9%) HABSIs were more prevalent in COVID-19 patients. Those with bacterial COVID-19 had a higher death hazard ratio (HR) than patients without bacterial COVID-19 (HR 1.91, 95% CI 1.49-2.45).

Discussion:

Researchers demonstrated that the epidemiology of HABSI in critically sick patients differed between COVID-19 and nonCOVID-19 patients using a sizable multicontinental prospective cohort. Patients with COVID-19 were more likely to experience enterococcal HABSIs. Enterococcal HABSIs were common in critically ill COVID-19 patients, with rates ranging from 25% to almost 50%.[4,5] It's interesting to note that very few research have examined the differences between critically ill HABSI patients with COVID-19 and those without it. The first study compared critically ill COVID-19 patients with comparable non-COVID-19 patients and found that COVID-19 patients had a greater rate of enterococcal HABSI.[2] Although this study (1) only included a small number of patients, (2) only reported a small number of all-causes HABSI without enterococcal HABSI in non-COVID-19 patients, and (3) included non-COVID-19 patients before the COVID-19 pandemic, it is important to note these shortcomings.

Conclusion:

Researchers demonstrated that the epidemiology of HABSI differed between COVID-19 and non-COVID-19 patients using a significant multicontinental prospective cohort, with enterococcal HABSI being disproportionately more prevalent in COVID-19 individuals. COVID-19 patients with HABSI had significantly higher fatality rates than patients with HABSI but without COVID-19, despite having fewer comorbidities and lower severity scores at admission.

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2.Prospective Randomized Controlled Study on Comparison of Chest Tube Insertion Site Dressings

Introduction:

A flexible tube that can be placed through the chest wall between the ribs and into the pleural space is called a chest tube, also known as a thoracostomy tube. Thoracostomy tubes are often composed of silicone or PVC.[1] After the insertion of a thoracostomy tube, there is little empirical data available to inform judgments about the type of dressing to use and how frequently to change the dressing.[2] This prospective randomised controlled trial compared different dressing types and procedures used after mediastinal and thoracic chest tubes were implanted. Time between dressing changes, skin integrity, the presence of air leaks, and patient-reported pain were all outcome measures.

The silicone foam dressing was the best dressing type for maintaining skin integrity and patient comfort.

Methods:

A total of 127 patients with 236 chest tubes from 3 intensive care units at a regional medical facility made up the random sample for the study. The patients were divided into 3 groups and randomly assigned to receive either a gauze and tape dressing changed once a day, a gauze and tape dressing changed every three days, or a silicone foam dressing changed every three days.

Results:

Patients who used silicone foam dressings reported less discomfort at the insertion site than those who used traditional gauze and tape dressings, and those who changed their dressings daily reported noticeably more pain when doing so than those who changed their dressings every three days. Compared to the gauze and tape dressing, the silicone foam dressing was associated with greater skin integrity. Patient demographics, the number of days with a chest tube in place, and dressing intactness did not vary substantially across the three groups.

Discussion:

This study identified several important variations in chest tube insertion site dressings. According to this research, a silicone foam dressing may provide superior drainage control, pain relief, and skin integrity than a gauze and tape dressing.2 Overall, there was less pain and better skin integrity when dressing changes were spaced out longer. According to earlier research, a transparent adhesive dressing is

similar to dry gauze, and reported pain is higher when a petroleum-saturated gauze and foam tape dressing is used than when no dressing is used or a dry, sterile dressing.2,3 Jones et al. compared normal gauze with a dry dressing to a transparent adhesive dressing on 79 patients, and observed no differences in skin irritability or skin tears.3

Assessment	Mean (SE) score on scale of 0-10		
	Gauze/daily (n=41)	Gauze/3-day (n=44)	Foam/3-day (n=42)
Pain at insertion site	n=40		
Average across all days	1.0 (0.2)	0.7 (0.2)	0.5 (0.2)
Maximum across all days	1.5 (0.4)	2.2 (0.5)	1.1 (0.3)
Pain with dressing removal	n=39	n=38	n=37
Average across all days	0.9 (0.2)	0.2 (0.2)	0.2 (0.2)
Maximum across all days	1.6 (0.4)	0.4 (0.2)	0.3 (0.1)

Pain assessment

Conclusion:

The findings of this study may inform best practises for chest tube insertion site dressings, such as the kind of dressing and how frequently dressing changes should be made in order to preserve skin integrity and reduce patient discomfort. Better outcomes and higher patient satisfaction will result from these practise enhancements. In this study, silicone foam dressings that were replaced every three days outperformed traditional gauze and tape dressings.

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3.Assessment of the Relationships Between Platelet Count, Mean Platelet Volume, and Platelet Transfusion with Intraventricular Hemorrhage and Mortality in Preterm Infants

Introduction:

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Thrombocytopenia is characterised by a platelet count below the lower limit of normal, which is 150000/microliter.[1] Infants frequently need platelet transfusions to treat severe thrombocytopenia or stop bleeding. The development of new procedures can be supported by research into the relationships between intraventricular haemorrhage (IVH), mean platelet volume (MPV), platelet transfusion, and platelet count (PC) in preterm newborns.[2] In order to determine if platelet transfusion-associated IVH and mortality risks vary with PC and MPV levels at the time of transfusion, this study evaluated the relationships between platelet transfusion, PC, and MPV and IVH and in-hospital mortality.

Platelet transfusion, platelet count, and mean platelet volume were linked to death in preterm newborns. PC was also linked to any grade intraventricular haemorrhage (IVH) and severe IVH.

Methods:

Preterm infants who were admitted to the hospital on their delivery date and were given ventilation while there were included in this retrospective cohort research. Between May 2016 and October 2017, the study was carried out in a referral facility for newborn intensive care units. Between December 2020 and January 2022, data were retrieved and examined. Platelet transfusion, PC, and MPV were the exposures. Any grade IVH, severe IVH (grade 3 or 4), and in-hospital mortality were the primary outcomes.

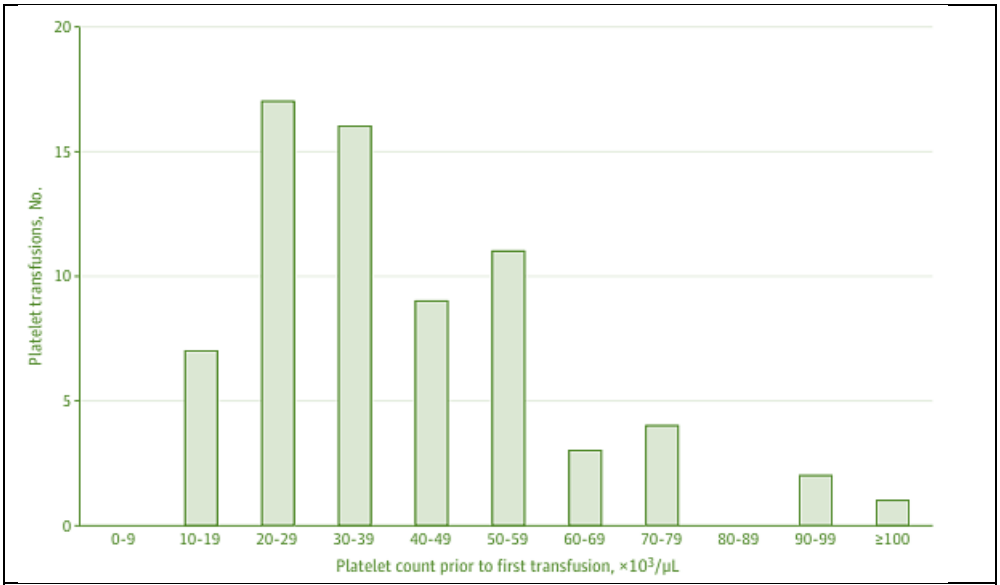
Results:

The median [IQR] gestational age of the 1221 preterm newborns (731 [59.9%] males) was 31.0 [29.0-33.0] weeks, and 94 (7.7%) of them had 166 platelet transfusions. Platelet transfusion was substantially linked with death after adjusting for possible confounders (hazard ratio [HR], 1.48; 95% CI, 1.13-1.93; P =.004). With any grade IVH (HR per $50 \times 10^3/\mu L$, 1.13; 95% CI, 1.05-1.22; $P = .001$), severe IVH (HR per $50 \times 10^3/\mu L$, 1.16; 95% CI, 1.02-1.32; $P = .02$), severe IVH (HR per $50 \times 10^3/\mu L$, 1.16; 95% CI, 1.02-1.32; $P = .02$), and mortality (HR per $50 \times 10^3/\mu L$, 1.74; 95% CI, 1.48-2.03; $P < .001$), a lower PC was significantly related. Lower mortality risk was linked to increased MPV (HR, 0.83; 95% CI, 0.69-0.98; P =.03). When platelet transfusion was conducted on infants with a greater PC level, the risks for IVH and mortality increased (eg, PC of $25 \times 10^3/\mu L$: HR, 1.20; 95% CI, 0.89-1.62; PC of $100 \times 10^3/\mu L$: HR, 1.40; 95% CI, 1.08-1.82). The risk of IVH and mortality following platelet transfusion changed according to the MPV level at the time of transfusion.

Discussion:

Research on the correlations between neonatal mortality and bleeding, PC, and platelet transfusion is abundant. 2 Few investigations, though, have combined examination of these aspects. Platelet transfusion, PC, and MPV were all assessed in this study simultaneously as time-varying covariates while other potential confounding variables were corrected.[2] According to this research, platelet transfusion was strongly linked to mortality, and each subsequent transfusion was

linked to a 0.5-fold higher risk of death in preterm newborns. For a long time, excessive platelet transfusion has been linked to neonatal mortality.[3] An increase in mortality as well as comorbidities, such as IVH, were linked to platelet transfusion in a cross-sectional study of preterm newborns carried out by Elgendy et al.[4]



Distribution of Platelet Counts Prior to First Platelet Transfusion in Preterm Infants

Conclusion:

Platelet transfusion was linked to mortality in this retrospective cohort analysis of ventilated preterm neonates. Reduced PC levels and thrombocytopenia were linked to higher mortality and IVH risks. Increased MPV levels were linked to a decreased death rate. The risks of IVH and mortality associated with platelet transfusion appeared to differ with the PC and MPV levels at the time of transfusion.

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4.Management of persistent air leak in a mechanically ventilated patient with endobronchial fibrin sealant and autologous blood patch: A Case Report

Introduction:

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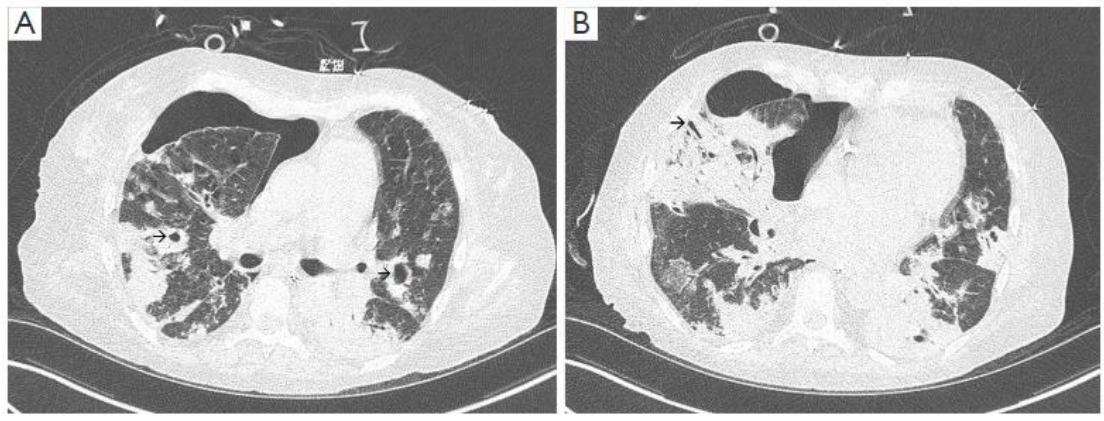
The most severe postoperative consequence of thoracic surgery is bronchopleural fistula (BPF). The fustula is closed with fibrin sealant in these cases.[1] Similar to this, alveolar-pleural fistulas (APF) are pathologic connections between the pleural space and the pulmonary parenchyma that can result in persistent air leaks (PALs). Based on anticipated air leak resolution following lobectomy, PALs are most frequently characterised as leaks lasting longer than seven days.[2] PALs, or persistent air leaks, are linked to a high morbidity rate. Researchers describe a case where a PAL was successfully treated in a mechanically ventilated patient using an endobronchial autologous blood patch and fibrin sealant.

Persistent air leaks caused by alveolar-pleural fistula in patients on mechanical ventilation can be effectively treated with endobronchial autologous blood patch with fibrin sealant.

Case Presentation:

A 61-year-old female with diabetes who had necrotizing pneumonia and needed invasive mechanical ventilation was admitted to intensive care unit (ICU). Bilevel positive airway pressure (BPAP) ventilation was initially initiated for her, but as her respiratory acidosis worsened, she had to be intubated. Pseudomonas aeruginosa, methicillin-resistant Staphylococcus aureus, and Proteus mirabilis were detected in the endotracheal sputum by microbiology. She was given piperacillin-tazobactam and azithromycin as an empirical treatment for pneumonia, and when her sensitivities returned, her medication was changed to ciprofloxacin and vancomycin. An APF and pneumothorax were the results of her necrotizing pneumonia. Four days after being admitted to the ICU, her first pneumothorax was found, and it was large enough to cause mediastinal displacement. Her pneumothorax nearly completely resolved when an 8 French chest tube was placed and connected to suction at 20 cmH2O. A 14 French chest tube was implanted since she developed hypotension later on that day and it was discovered that her pneumothorax had expanded. Despite this, her right lung did not completely re-expand. After 2 days, thoracic surgery was consulted, but they felt that given her frailty, hemodynamic instability, and the bilateral nature of her necrotizing pneumonia, she was not a surgical candidate. yet the air leak persisted. Three days following the onset of her pneumothorax, she received an endobronchial autologous blood patch when the conservative care of her PAL failed. Due to two factors—first, imaging revealed a problematic airway subsegment; second, chemical pleurodesis posed an unacceptable risk of inducing acute respiratory distress syndrome (ARDS) in a patient who was already experiencing respiratory failure. Endobronchial management was tried instead of chemical pleurodesis. With an inspiratory pressure of 22 cmH2O and a positive end expiratory pressure of 8 cmH2O, the patient was mechanically ventilated using pressure control ventilation. In order to find the PAL, a sequential balloon occlusion technique was used. This comprised occluding the segmental airways with an endobronchial balloon catheter until the leak was reduced or resolved. There may not have been much collateral ventilation because the leak stopped when the medial section of the right middle lobe was occluded. Then, researchers injected 25 mL of blood through the port on the endobronchial balloon catheter using blood that was taken from a central venous catheter. Researchers gave the balloon five minutes to occlude in order to promote clot formation. After the blood patch, there was no air leak, and her chest tubes were removed from suction two days later.

Sadly, she experienced a leak again 4 days after her endobronchial blood patch. On day 8 after PAL, a second endobronchial blood patch was done using the same approach as the first, but blood was injected into both the medial and lateral regions of the right middle lobe and the airway was blocked with a balloon for 10 minutes. The chest tubes were not reconnected to suction after the procedure, and there was no air leak. She experienced intermittent air leaks via her 24-French chest tube the next day, but not through the 8-French or 14-French chest tubes that were removed. Her remaining chest tube was attached to a 20 cmH2O suction. Her pneumothorax reaccumulated and was consequently reattached to suction after her chest tube was momentarily detached from suction for imaging testing. She received her third endobronchial treatment procedure to treat her PAL on day 15 of the condition while using pressure control ventilation with an inspiratory pressure of 10 cmH2O and a positive end expiratory pressure of 5 cmH2O. Once more, the balloon catheter's lumen was filled with 25 mL of autologous blood, and balloon occlusion was used for 5 minutes. In order to better constrict the airway and promote clot formation than utilising autologous blood alone, the following 2 mL of Tisseel fibrin sealant was infused into the balloon lumen. Occlusion was then performed for another 5 minutes. At the completion of the procedure, she had no air leaks, and the suction on her chest tube was removed. She managed the procedure well, and neither her need for oxygen nor ventilator assistance increased. 23 days after her original pneumothorax was discovered, her surgical chest tube was removed because there was no return of the air leak. 32 days after her initial pneumothorax, her respiratory condition improved and she was no longer in need of invasive mechanical ventilation. After her PAL, which was 4 months ago, her air leak has not since recurred.



Axial cut 1 mm computer tomography chest showing (A) bilateral cavitating consolidation indicated with black arrows and right- sided pneumothorax, (B) right middle lobe consolidation with suspected alveolar-pleural fistula indicated with a black arrow.

Discussion:

Although they are regarded as a third line of treatment following conservative and surgical management, endobronchial therapies are successful in controlling PALs. In this instance, a mechanically ventilated patient with a PAL caused by APF from necrotizing pneumonia is treated with an additional endobronchial method.[2] Zhang et al. used a similar technique in which autologous blood and thrombin were used for PALs in non-

ventilated patients; they reported success rates of 82%, which was equivalent to the 84% success rates of patients treated with silicone spigots for their PALs. [3]

Conclusion:

This example demonstrates that PALs caused by APF in mechanically ventilated patients can be successfully treated with an endobronchial autologous blood patch with fibrin sealant. A secure, easily accessible, and affordable solution is the combination of an autologous blood patch and fibrin sealant technique where balloon occlusion was maintained for 5 minutes. This method has no long-term effects on the airways and does not require a further bronchoscopy to remove the equipment.

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