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A rare case of pleural empyema caused by *Clostridium baratii*

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Introduction: *Clostridium baratii* is an anaerobic, motile, Gram-positive bacterium. It is a rare cause of infant botulinum. We present a rare case of pleural empyema caused by *C. baratii*.

Case Presentation: A 74-year-old female presented to ER with chief complaint of right-sided chest pain and shortness of breath. She was discharged from the hospital 10 days ago due to small bowel obstruction caused by internal hernia resulting in laparotomy. On examination, she was afebrile and hypoxic with O₂ saturation of 89%. She had diminished breath sounds in the right lung field. CT chest showed moderate right pleural effusion with compressive atelectasis and right lower lobe infiltrate. She was given vancomycin, levofloxacin and cefepime for possible healthcare associated pneumonia. Ultrasound guided right sided thoracentesis revealed exudative effusion. A 14F pigtail catheter was placed under CT guidance and tissue plasminogen activator (tPA) was infused via catheter to help drain the fluid. Total of 3.5L pleural fluid was drained over 5 days with the tPA infusion. Repeat cultures of pleural fluid came back positive for *Clostridium baratii* which was sensitive to Penicillin. The catheter was removed and she received a PICC line. She was discharged home with home healthcare on Ampicillin-Sulbactam to complete total of 3 weeks' treatment. During the course of treatment her symptoms resolved.

Discussion: Clostridial pleuropulmonary infections are rare; most of these infections are attributed to *Clostridium perfringens*. *Clostridium baratii*, usually associated with infant botulisms has not been reported to cause pulmonary infections. Trauma, chest surgery or other invasive procedures and underlying lung disease are often found to precede clostridial empyema. In our patient, spread of *C. baratii* most likely occurred after a recent abdominal surgery which may have resulted from transdiaphragmatic lymphatic translocation. Intra-pleural infusion of tPA is a controversial treatment for empyema. If combined with DNase may result in better drainage. This treatment was effective in our patient and resulted in resolution of the empyema.

Conclusions: Although mostly associated with infant botulisms, *Clostridium baratii* may be associated with other infections in immunocompetent patients particularly pulmonary infections. Infusion of tPA via catheter is an effective option before considering surgery in cases with pleural empyema.

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Curcumin has a dual effect on targeting the lung cancer cell lines

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Exposure to arsenic is one of the major causes of lung cancer due to production of Reactive Oxygen Species (ROS). Herbal medicine is a new approach used for prevention or treatment of cancers. Among various herbal compounds, a lot of attention has been paid to curcumin, as antioxidant, anti-proliferative, anti-carcinogenic and anti-tumour and pro-apoptotic properties of curcumin have been well studied. In the present study, we investigated the effects of curcumin on lung cancer cell lines and arsenic-treated lung cancer cell lines, originated from different stages of lung cancer development. Here, we measured ROS generation and caspase 3/7 activity for both curcumin-treated cell lines and those co-treated with arsenic and curcumin. Then, we studied lipid peroxidation, intracellular ATP content, and cytochrome c release to further investigate how ROS generation and curcumin exert synergistic effects and direct cells toward apoptosis. According to our data, curcumin has a dual effect on ROS generation which is dependent on specific concentration as a threshold and seems to induce apoptosis by two different mechanisms. Moreover, for the first time we report that curcumin delays the drop in ATP levels in these cell lines and hence provides required energy for apoptosis process. Furthermore, western blot analysis reveals that release of cytochrome c is highest when ATP begins to drop in the presence of curcumin. To sum it up, it seems that curcumin is strong candidate for prevention or treatment of lung cancer, especially at stage 2.

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