CORYNEBACTERIUM STRIATUM (CS) - IMPLICATIONS IN THE PATHOGENESIS OF VENTILATOR-ASSOCIATED PNEUMONIA (VAP). LOCAL PECULIARITIES OF EPIDEMIOLOGY AND TREATMENT

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Abstract: *Nondiphtherial corynebacteria may induce alone or along with other germs, severe respiratory infections in critically ill patients. We conducted a retrospective study over a period of one year, which included patients diagnosed with VAP using CDC diagnostic criterion. Patients were divided into three groups: group A comprising 12 patients who developed infection only with Cs, group B comprising 16 patients with VAP produced by Cs and other pathogens and group C comprising 127 patients as reference group. VAP incidence with Cs was 11.2% of all infections, 42% representing single infection, the others co infections or super infections with Cs. Cs infection was associated statistically significant (p <0.05) with severe neurological pathology. VAP mortality induced by this germ was 58%, significantly higher value compared to local mortality in VAP (35%). Evolution was more severe and increased mortality in cases of co infection/super infection particularly in combination with Acinetobacter spp. If the initially the pathogen was sensitive to antibiotics, further the spectrum of resistance narrowed, germ became resistant to carbapenems and quinolones. Evolution of pulmonary infections due to Cs is severe because of its high pathogenicity, acquired microbial resistance to carbapenems and immunological profile of the critically ill patient.*

Cuvinte cheie: *Corynebacterium striatum, pneumonia asociata ventila□iei mecanice*

Rezumat: *Corynebacteriile nondifteroide pot produce ca □i agen□i patogeni sau copatogeni, infec□ii severe respiratorii la pacien□ii critici. Am desfa□urat un studiu retrospectiv pe o perioadă de un an, ce a inclus pacien□ii diagnostica□i cu VAP, utilizând criteriile de diagnostic CDC. Pacien□ii au fost împăr□i□i in trei loturi: lotul A cuprinzând 12 pacien□i ce au dezvoltat monoinfec□ie cu Cs, lotul B cuprinzând 16 pacien□i cu VAP de etiologie plurimicrobiană (Cs □i al□i patogeni), respectiv lotul C cuprinzând 127 pacien□i, ca lot de referin□ .Incidien□a VAP cu Cs a reprezentat 11,2 % din totalul infec□iilor, 42% reprezentând primoinfec□ii cu Cs restul coinfec□ii sau suprainfec□ii. Infec□ia cu Cs s-a asociat semnificativ statistic, (p<0.05) cu patologia neurologică severă. Mortalitatea prin VAP cu Cs a fost de 58%, valoare semnificativ mai ridicată comparativ cu mortalitatea locală prin VAP (35%). Evolu□ia a fost mai severa □i rata mortalită□ii crescută în cazurile de coinfec□ie/suprainfec□ie în special în asociere cu Acinetobacter spp. Dacă ini□ial agentul patogen a fost sensibil la antibioterapie, ulterior spectrul de rezisten□ ă-a îngustat, germenul devenind rezistent la carbapeneme □i chinolone. Evolu□ia infec□iilor pulmonare cu Cs e severă din cauza patogenită□ii ridicate a germenului, dobândirii rezisten□ei microbiene la carbapeneme □i al profilului imunologic al pacientului critic.*

INTRODUCTION

Ventilator-associated pneumonia (VAP) is a form of nosocomial pneumonia that develops 48 hours or longer after mechanical ventilation (MV). It is an inflammation of lung parenchyma induced by germs that are not present at the start of MV. VAP is a major cause of infections in ICU leading to increased morbidity, mortality and cost of care. Since 2007 the occurrence of this infection in ICU is no longer considered an accident but medical negligence. Nondiphtherial corynebacteria normally colonize the skin and mucous membranes. They are usually not involved in the pathology of VAP but may induce as pathogens or co-pathogens severe respiratory infections in critically ill patients. (1) Due to increasing need for invasive mechanical ventilation in ICU departments, the implications of new pathogens are becoming very important.

THE AIM OF THE STUDY

The report consisted of Cs as a possible pathogen of VAP, in establishing the infection characteristics, the epidemiological and clinical antibiotics resistance profile in ICU Department Elias and determining factors that influence the microbial resistance to antibiotics of Cs.

MATERIAL AND METHOD

We performed a retrospective study conducted over a period of 12 months (01.03.2010 - 31.03.2011) on 156 patients from ICU Department Elias who developed VAP (different microbial etiologies). As the VAP diagnostic criteria we used CDC recommendations (using clinical, radiological and microbiological criteria) (2). Exclusion criteria were: presence of pulmonary infectious pathology at admission time, extreme ages (patients under 18 years and over 75 years), and presence of severe lung disease in personal history. Depending on the occurrence of Corynebacterium striatum infection patients were divided into 3 groups: group A (12 patients) – infection only with Cs, group B (16 patients) - coinfection/superinfection with Cs and group C (127 patients) - patients who developed VAP with common germs involved in this pathology. Consignments are comparable in terms of disease severity (APACHE score, SOFA score) and we have excluded patients who died from

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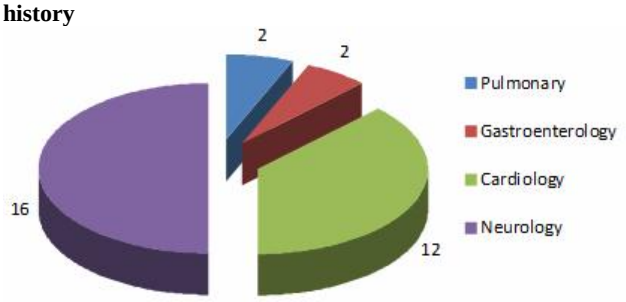
others causes that lung infection. Groups A and B are statistically comparable, and group C was used as a reference system. We studied the incidence, mortality, the correlation with associated pathology, duration of mechanical ventilation, microbial resistance and its variation during the study.

RESULTS

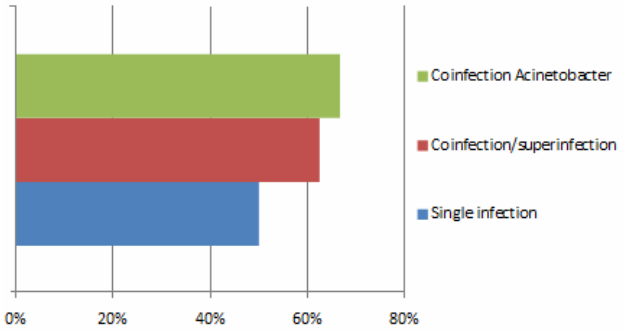
The incidence of VAP with Cs was 11.2% of all ventilator-induced pneumonia, 42% representing single infection with Cs the others co infections or super infections. Diagnosed with early onset of VAP were 28% of patients and others with late onset of VAP. Cs infection was associated more often, statistically significant ($p < 0.05$) with severe neurological pathology. (Figure 1)

Figure no. 1. VAP presence linked to medical personal history



VAP induced by Cs mortality was 58%, significantly higher value compared to local mortality in VAP (35%). Evolution was more severe and increased mortality was reported in cases of co infection / super infection particularly in combination with Acinetobacter spp, compared with single infection, but without statistical significance. (Figure 2)

Figure no. 2. Mortality rate variation with germs involved

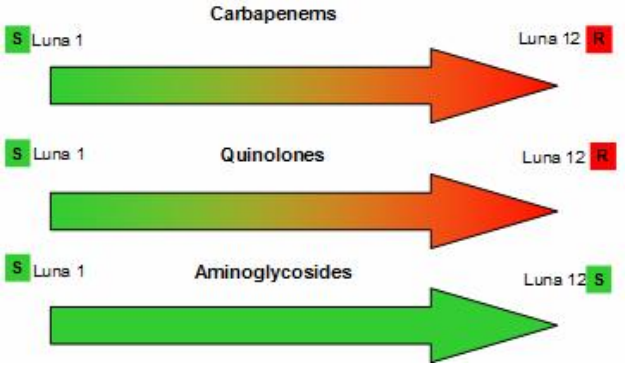


Mean length of mechanical ventilation was 15.8 days sensitive higher than group C (12.7 days), more patients requiring tracheotomy. If the pathogen was initially sensitive to carbapenems, quinolones, macrolides and aminoglycosides, further narrowed the spectrum of resistance, the species becoming resistant to carbapenems and quinolones.

DISCUSSION

Local epidemiological profile, resulting from these study reassembly microbiological reports in the medical literature worldwide. Most patients developed late onset of VAP, which leads to a more severe evolution of disease. Source of infection, although it is difficult to detect clearly is likely to be neurological intensive care unit, especially the first light of immunological and clinical characteristics of these patients. The method of transmission of this specific infection was from patient to patient. (3) That why we insist to apply all the VAP prevention measures (which have proven to be effective only together). Therapeutic approach, especially antimicrobial therapy, was based on the principles of treatment of a severe infection in ICU and specific characteristics of Cs. We mainly used three classes of antibiotics: aminoglycosides, fluoroquinolones and carbapenems. There is retained sensitivity to aminoglycosides, proven sensitivity since the first reports of the pathogen Cs (Figure 3). Could be a little surprising the outbreak of resistance to carabpenems. There is a global trend of increasing resistance to carbapenems. Metallo-β-lactamases (VIM, IMP, and SIM) confer resistance to all β-lactami except Aztreonam. The most common β-lactamase with carbapenemase activity is CHDL and is likely to occur with Cs.

Figure no. 3. Antibiotics sensitivity



CONCLUSIONS

In recent years there is an emergence of opportunistic agents in VAP pathology, along with "traditional" microbial species. Pulmonary infection with Cs was associated more frequently in patients with severe neurological disease in a significant percent ($p < 0.05$). VAP with Cs causes a high mortality rate especially in combination with Acinetobacter spp. This opportunistic infection progresses to resistance to carbapenems and fluoroquinolones

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