



Iron deficiency and infections in surgical patients

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Objectives: Iron deficiency is the most common hematological disorder. Since iron is a fundamental nutrient for humans and pathogens, controversial hypotheses have been suggested for either higher susceptibility to infections, due to impaired cell-mediated or humoral immunity or, in contrast, protection from infections, due to decreased iron reserves available for the pathogens in the iron-deficient hosts. However, the limited available evidence concludes that subjects with iron deficiency may be more susceptible to infections than individuals with normal iron status. We aimed to study the association of iron deficiency with the susceptibility to infections in a group of surgical patients.

References:

1. Kumar V, Choudhry VP (2010) Indian J Pediatr 77(7):789–793
2. Levy A, Fraser D, Rosen SD, Dagan R, et al (2005) Eur J Epidemiol 20(3):277–284
3. Tansarli GS, Karageorgopoulos DE, et al (2013) Eur J Clin Microbiol Infect Dis 32:1253–1258

Methods: From January 1st to December 31st 2013 we prospectively monitored all the infections diagnosed in the patients of the surgical ward and correlated with their iron status. A total of 395 patients were included in this study. Blood samples were drawn for full blood count and hematological indices. Iron deficiency and anaemia were defined according to the WHO criteria of serum ferritin ≤ 12 g/L and haemoglobin < 11 g/dL, respectively. For the isolation of the pathogens implicated in the different infections diagnosed in the surgical ward, clinical specimens collected from the patients were inoculated onto appropriate plates for standard aerobic and anaerobic cultures and incubated at 37°C for 24h and 48h, respectively. A gram-stained smear prepared from each specimen was examined under the microscope to obtain valuable information about the types of microorganisms present. The automated system VITEK 2 (BioMerieux, Marcy l'Etoile, France) was used for the identification of the isolated pathogens.

Results: From the total of 395 patients, 310 were iron-deficient and 85 had normal iron status. Positive cultures displayed 195 (62.9%) iron-deficient patients and 30 (35.3%) subjects with normal iron status ($p=0.0001$). The sites of infection (respiratory tract, abdominal, urinary tract, surgical site, wound/soft tissue, device-related) as well as the isolation rate of the different pathogens associated with these infections were comparable between groups (aerobic gram-negative rods 60.9% vs. 60.9%, aerobic gram-positive cocci 27.1% vs. 24.4%, Candida isolates 8.1% vs. 9.8% and anaerobic bacteria 3.9% vs. 4.9%).

Conclusion: We found that iron deficiency or iron deficiency anemia was associated with a higher occurrence of different types of infections in the patient population evaluated. However, the prevalence of the isolated pathogens was comparable between the patients with or without iron deficiency. It could be possible that iron deficiency is more important for human immunity than for the pathogens' metabolism, thus explaining the increased susceptibility to infections of the iron-deficient patients compared to those with normal iron reserves.

