Letter

Discriminating invasive fungal infection from colonization

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See related research article by Xie *et al*., http://ccforum.com/content/12/1/R5

We read with interest the article by Xie and colleagues reporting the impact of invasive fungal infection (IFI) on outcomes [1]. In a cohort of 318 intensive care unit patients with severe sepsis they found 90 patients with IFI (28.3%). Ninety-three per cent of the IFIs were caused by *Candida* species, 3% by *Aspergillus* species and 4% were unclassified. Predominant sites of infection were the lung (56.4%) and the abdomen (22.7%). As such, *Candida* pneumonia was the most frequent type of infection in this cohort, representing 53.6% of all IFIs (we assume that all cases of aspergillosis were pulmonary). This is most remarkable as the presence of *Candida* in respiratory tract cultures is seldom pathogenic and *Candida* pneumonia is considered a rare disease entity in which the diagnosis can only be made by histological confirmation [2]. The same remark is valid for intra-abdominal IFI. The presence of *Candida* from intraabdominal cultures does not necessarily represent *Candida* peritonitis [3].

The authors point out that histological confirmation was often impossible due to coagulation disorders. We acknowledge the risk of biopsy sampling in critically ill patients [4,5]. Nevertheless, in Xie and colleagues' study the degree of diagnostic validation of IFI is poor and we question the true incidence of *Candida* pneumonia and peritonitis. As such, mixing IFIs with fungal colonization might have influenced the results. We therefore invite Xie and colleagues to report the incidence of truly confirmed invasive IFI and to make a comparison in mortality with cases of presumed IFI.

Authors' response

Guohao Xie and Xiangming Fang

We thank Blot and colleagues for their critical comments. We agree that histological conformation is the gold standard for diagnosis of IFI and it is difficult to discriminate IFI from colonization without biopsy. Since haemodynamic and/or respiratory insufficiency and coagulopathy are common in critically ill patients, the risks of biopsy preclude histological conformation in most patients. We therefore established several criteria to capture IFI patients without biopsy, as described in our study [1]. Similarly, Vandewoude and colleagues established a diagnostic algorithm based upon clinical manifestations, imaging data and microbiological findings to assess invasive aspergillosis without biopsy [5]. Among the 90 patients with IFI in our study, 21 with confirmed IFI had a comparable hospital mortality to the remaining 69 patients with presumed IFI (76% versus 65%, $P = 0.43$). The 69 cases with presumed IFI, however, had not been further validated since autopsy was refused by all of their families. This may lead to an overdiagnosis of IFI in these patients, which we have acknowledged as the major limitation in our article.

We believe that, despite histological conformation, a diagnostic algorithm of IFI based upon clinical manifestations, imaging data and microbiological findings still needs to be established in the future for clinical practice and epidemiological studies.

IFI = invasive fungal infection.

Competing interests

The authors declare that they have no competing interests.

References

1. Xie G-H, Fang X-M, Fang Q, Wu X-M, Jin Y-H, Wang J-L, Guo Q-L, Gu M-N, Xu Q-P, Wang D-X, Yao S-L, Yuan S-Y, Du Z-H, Sun Y-B, Wang H-H, Wu S-J, Cheng B-L: **Impact of invasive fungal infection on outcomes of severe sepsis: a multicenter matched cohort study in critically ill surgical patients.** *Crit Care* 2008, **12:**R5.
2. Blot S, Vandewoude K: **Management of invasive candidiasis in critically ill patients.** *Drugs* 2004, **64:**2159-2175.
3. Blot S, Vandewoude K, De Waele J: **Candida peritonitis.** *Curr Opin Crit Care* 2007, **13:**195-199.
4. Vandewoude KH, Blot SI, Benoit D, Colardyn F, Vogelaers D: **Invasive aspergillosis in critically ill patients: attributable mortality and excesses in length of ICU stay and ventilator dependence.** *J Hosp Infect* 2004, **56:**269-276.
5. Vandewoude KH, Blot SI, Depuydt P, Benoit D, Temmerman W, Colardyn F, Vogelaers D: **Clinical relevance of Aspergillus isolation from respiratory tract samples in critically ill patients.** *Crit Care* 2006, **10:**R31.