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The size of catheters: an important parameter to consider in assessing infectivity

Type of article: Mini review

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Abstract
The diagnosis of catheters' infectivity is established considering several parameters. These relate to the clinical patients' data and the microbial load of the catheters following their culture. Catheter infectivity type is related to the significance threshold. However, differences in sizes exist between several catheters. So, in order to qualify any microbial alteration, it is important to take into account the impact of the size of the catheters. For this, future studies should consider this parameter to assess microbial load properly.

Key words: Catheters; Infectivity; Diagnosis; Microbial Colony Forming Unit.

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1. Important concepts

The ascertainment of this article is the result of several published studies. Despite notable progress in the study of microbial infectivity of catheters, which refer to their degree of bacterial and/or fungal alteration, the determination and distinction of catheter infection versus simple contamination remain the primary objective for clinicians before making an appropriate antimicrobial therapeutic decision.

Since the publication of the work in [1] which focused on the semi-quantitative method of culture and identification of catheter-related infections, discussion of the sensitivity and specificity of a better technique for diagnosing catheter infectivity is still needed. Unlikely, Cleri and his team [2] proposed in 1980 a quantitative technique to examine catheters after removal of patients. Seven years later, Brun-Buisson et al. [3] modified the Cleri technique to obtain results that are more reliable. Recently, our team proposed the combination of two quantitative techniques for the evaluation of microbial infectivity of catheters [4]. While, it should be interesting to remember the following concept; Colony-Forming Unit (CFU) counting entails microbe culturing and counting only viable cells, in contrast with the microscopic investigation to compute the amount of all types of cells, living or dead. [5]

In order to guide their studies, many authors agree on the collection of clinical data of patients with altered catheters. These data mainly concern the prognosis of the disease, the treatment regimen, the type of implanted catheter and its implantation duration. [2, 3, 6, 7,8].

Besides, the diagnosis of catheter infection is based on clinical and microbiological criteria [6,9], which are often marked by the presence of local or systemic signs of infection [10].

Indeed, the infection of the catheter is evidenced by its positive culture with a threshold of significance [11]. In this context, several proposals have been made.

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A threshold of 15 CFU to define the existence of significant colonization of the catheter appeared in [1], but the work in [13] reported it at ≥ 50 CFU. On the other hand, the threshold was lowered in [14] to 5 CFU to increase the sensitivity of the technique, whereas a threshold of 25 CFU would be more specific for the diagnosis of infection according to [12]. Otherwise, the threshold value for quantitative techniques is 10^3 CFU / mL [3] or 10^3 cells / mL [8].
Anyway, for many catheters other than peripheral vascular ones, which are characterized by their relatively large size, infectivity evaluation should consider the size of the catheter. This concerns the length of the removed portion of the catheter and its diameter (Figure 1).

Figure 1: Fragment of a urinary catheter taken from an inpatient in the intensive care unit-Sidi Bel Abbes University Hospital - Algeria. Use of sterile graduated rule.

Catheters can have a large variety of sizes, constituents and types. Clinician has to keep in mind numerous factors, e.g., medical necessity, expected time of use, individual choice and the infection risks involved [15, 16].
For these reasons, we suggest for greater precision, that the results of the CFU / mL or cell / mL evaluation be supplemented by the unit length. Conversely, the neglect of these last two parameters, the length of the removed part of the catheter and the diameter thereof, may lead to visibly erroneous results as to the microbial load of the catheter removed; therefore, the significance level will be incorrect.

1. Conclusion

The diagnosis of catheter infectivity involves several parameters related to the clinical information of the patient and the microbial presence on the catheter after culturing. The catheter infectivity type is related to the level of significance. Nevertheless, differences in dimensions do exist between several kinds of catheters. For this, future studies should contemplate this parameter to properly evaluate the microbial load.

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3. Conflict of interest statement

We certify that there is no conflict of interest with any financial organization in the subject matter or materials discussed in this manuscript.

4. Authors' biography

No Biography

5. References

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