Letter to the Editor

Comment on "Incidence of risk factors for bloodstream infections in patients with major burns receiving intensive care: A retrospective single-center cohort study"

Dear Sir,

We read with great interest the article recently published on *Burns* by Frochtmann-Frana et al. [1]. This study aimed to identify risk factors for blood stream infections in major burns. Authors finally conclude that "a greater TBSA and Abbreviated Burn Severity Index and the need for fasciotomy/escharotomy were associated with significantly higher incidence of blood stream infections [. . .] and increased mortality". Authors also state that "the number of BSIs caused by multidrug-resistant bacteria was relatively low, although the number has increased in recent years [. . .]". These results are very interesting, as they identify key risk factors and entry criteria that may result in BSI during ICU stay. However, as reported by the authors, "broad spectrum antibiotic treatment was started on admission or at the day of primary surgery in 345/472 (73%) of patients". This can be considered as antibiotic prophylaxis, which merits further discussion, as the systematic use of antibiotics favors the development of microorganism resistance [2].

Of course, infection management is the contemporary cornerstone of burn care. According to reports, infection is the overall leading cause of death among patients admitted to ICU, with a varying proportion between 42–75% among patients admitted to ICU for burn injuries [3]. Death rate of infected burn patients is more than twice the mortality rate of uninfected patients [4]. However, the prevalence of multidrug-resistant (MDR) bacteria in burn centers may also result from the overuse of broad-spectrum antibiotics, thus propagating a vicious cycle of increased antimicrobial resistance [5].

Actually, the data of the authors show a steady progression of MDR from none in 2003 to up to 8% of the cases in 2014, probably aggravated by the liberal prescription of Piperacillin/Tazobactam since 2007.

The use of prophylactic antibiotic treatment might be attractive, but can lead to a difficult abiding battle. Routine use has been extensively questioned and comprehensive data affirming that it outweighs the risk of drug toxicity and development of MDR is lacking.

A 2013 Cochrane review concluded after evaluation of 36 studies that there was no evidence of any effect on reducing rates of burn wound infection by using antibioprophylaxis, and therefore not sufficient evidence to recommend their usage [6]. On the other hand, evidence of a significant increase in antibiotic resistance after prophylactic use (with a relative risk 2.84), has been demonstrated [2]. This seems confirmed by the MDR increase over the years, as reported in Fig. 1.

Presently, there is a broad and uniform consensus in the literature that systemic prophylactic antibiotics should not be given on admission with severe burns. Latest recommendation from the International Society for Burn injury does not support the use of systemic antibiotic prophylaxis and explicitly state that prophylactic antibiotics are not recommended [7]. Despite the key-role of antibiotics in burn management, over-use should be limited to avoid emergence of bacterial resistance, which may lead to dramatic consequences in the long term [8].

Conflict of interest

None.

REFERENCES

[1] Fochtmann-Frana A, Freystatter C, Vorstandlechner V, Barth A, Bolliger M, Presterl E, et al. Incidence of risk factors for bloodstream infections in patients with major burns receiving intensive care: a retrospective single-center cohort study. Burns 2018;44(4):784–92.
[2] Avni T, Levcovich A, Ad-El DD, Leibovici L, Paul M. Prophylactic antibiotics for burns patients: systematic review and meta-analysis. BMJ 2010;340:c241.
[3] Sharma BR, Harish D, Singh VP, Bangar S. Septicemia as a cause of death in burns: an autopsy study. Burns 2006;32(5):545–9.
[4] Alp E, Coruh A, Gunay GK, Yontar Y, Doganay M. Risk factors for nosocomial infection and mortality in burn patients: 10 years of experience at a university hospital. J Burn Care Res 2012;33(3):379–85.
[5] Lachiewicz AM, Hauck CG, Weber DJ, Cairns BA, van Duin D. Bacterial infections after burn injuries: impact of multidrug resistance. Clin Infect Dis 2017;65(12):2130–6.
[6] Barajas-Nava LA, Lopez-Alcalde J, Roque i Figuls M, Sola I, Bonfill Cosp X. Antibiotic prophylaxis for preventing burn wound infection. Cochrane Database Syst Rev 2013(6)CD008738.
[7] Committee IPG, Steering S, Advisory S. ISBI practice guidelines for burn Care. Burns 2016;42(5):953–1021.
[8] Goldmann DA, Weinstein RA, Wenzel RP, Tablan OC, Duma RJ, Gaynes RP, et al. Strategies to prevent and control the emergence and spread of antimicrobial-resistant microorganisms in hospitals. A challenge to hospital leadership. JAMA 1996;275(3):234–40.

Swenn Maxence Krähenbühl*
Division of Plastic, Reconstructive and Hand surgery, Burn unit, Lausanne University Hospital, Lausanne, Switzerland

Olivier Pantet
Mette M. Berger
Division of Intensive care, Burn unit, Lausanne University Hospital, Lausanne, Switzerland

Wassim Raffoul
Pietro Giovanni di Summa
Division of Plastic, Reconstructive and Hand surgery, Burn unit, Lausanne University Hospital, Lausanne, Switzerland

* *Corresponding author at*: Centre hospitalier universitaire Vaudois, Service de chirurgie plastique et de la main, Rue du Bugnon 46, 1011 Lausanne, Switzerland.

E-mail address: Swenn.Krahenbuhl@chuv.ch (S. Krähenbühl).

http://dx.doi.org/10.1016/j.burns.2018.10.028

Letter to the Editor

Re: Comment on "Incidence of risk factors for bloodstream infections in patients with major burns receiving intensive care: A retrospective single-center cohort study"

Dear Editor,

We completely agree that the overuse of broad-spectrum antibiotics can cause selection of resistant bacterial populations and is not recommended [1,2].

In the retrospective study by Fochtmann-Frana et al. 27% of all patients did not receive any antibiotic treatment [3]. In the recent past and the present in our university institution we do not routinely use broad-spectrum antibiotics. The initiation of broad-spectrum antibiotic was always an individual decision. An empiric broad-spectrum antibiotic treatment was only initiated upon clinical signs and symptoms of serious infections such as sepsis, pneumonia, upper or complicated urinary tract, intra-abdominal infection, or deep wound infection in severely burned patients requiring intensive care. It is and was a standard that before starting antibiotic therapy at least 2 blood cultures and any other appropriate samples were taken, and if a causative organism was identified the antibiotic therapy was de-escalated.

It is evident that an increase of blood stream infections caused by multidrug resistant (MDR) bacteria from none in 2003 to up to 8% of the cases in 2014 was observed [3]. However, we do not agree that this was only caused 'by the liberal prescription of piperacillin/tazobactam since 2007' in our institution. In the present study, 4 out of 10 (40%) patients suffering from BSIs caused by MDR bacteria were transferred from countries with a higher prevalence of MDR [3,4]. These patients were often pre-treated with broad spectrum antibiotics, had often spent days in the other facility/hospital without surgical treatment and were already colonized with MDR when admitted to our institution [3,5]. It was previously suggested that due to late wound closure and increased usage of broad-spectrum antibiotics, further replacement by MDR bacteria can occur [6].

Nevertheless, we completely agree that careful consideration should always be given as to whether the antibiotic therapy is necessary or not. To treat or not to treat should always be an individual decision. In our institution we reevaluate daily the necessity of the antibiotic therapy in addition to a regular consultation of infectious disease specialists to discuss the current antimicrobial therapies of complicated cases.

Conflict of interest statement

There are no financial or other relationships, which may lead to a conflict of interest.

REFERENCES

[1] Lachiewicz AM, Hauck CG, Weber DJ, Cairns BA, van Duin D. Bacterial Infections after burn injuries: impact of multidrug resistance. Clin Infect Dis 2017;65:2130–6.
[2] Committee IPG, Steering S, Advisory S. ISBI practice guidelines for burn care. Burns J Int Soc Burn Inj 2016;42:953–1021.
[3] Fochtmann-Frana A, Freystatter C, Vorstandlechner V, Barth A, Bolliger M, Presterl E, et al. Incidence of risk factors for bloodstream infections in patients with major burns receiving intensive care: A retrospective single-center cohort study. Burns J Int Soc Burn Inj 2018;44:784–92.
[4] European Centre for Disease Prevention and Control. Surveillance of antimicrobial resistance in Europe – Annual report of the European Antimicrobial Resistance Surveillance Network (EARS-Net) 2017. Stockholm: ECDC; 2018.
[5] Freystatter C, Radtke C, Ihra G, Thalhammer F, Fochtmann-Frana A. Sepsis caused by multidrug-resistant klebsiella pneumoniae infection in a 23-year-old burn patient: case report and literature review. Ann Burns Fire Disasters 2018;31:113–7.
[6] Lee HG, Jang J, Choi JE, Chung DC, Han JW, Woo H, et al. Blood stream infections in patients in the burn intensive care unit. Infect Chemother 2013;45:194–201.

Alexandra Fochtmann-Frana*
Christian Freystätter
Vera Vorstandlechner
André Barth
Michael Bolliger
Medical University of Vienna, Clinical Division of Plastic and Reconstructive Surgery, Department of Surgery, Vienna, Austria

Elisabeth Presterl
Medical University of Vienna, Department of Infection Control and Hospital Epidemiology, Vienna, Austria

Gerald Ihra
Medical University of Vienna, Department of Anesthesiology and General Intensive Care, Vienna, Austria

Gabriela Muschitz
Medical University of Vienna, Clinical Division of Plastic and Reconstructive Surgery, Department of Surgery, Vienna, Austria

Martina Mittlboeck
Medical University of Vienna, Center for Medical Statistics Informatics and Intelligent Systems, Section for Clinical Biometrics, Vienna, Austria

Athanasios Makristathis
Medical University of Vienna, Division of Clinical Microbiology, Department of Laboratory Medicine, Vienna, Austria