Key issues in the infected patient care in the Emergency Department

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ABSTRACT

Objective. To develop a set of recommendations, by consensus of Emergency Medicine experts, on key aspects related to the care of adult patients with acute infection attended in Spanish emergency departments (ED).

Methodology. The study was divided into three phases: 1) To design a questionnaire by a coordinating group; 2) To conduct a survey in ED physicians in order to know their opinion on the issues raised by the coordinating group; 3) To develop a number of recommendations based on the responses to the questionnaire and their subsequent discussion.

Results. A group of 28 experts from different Spanish ED, as well as 5 members of the coordinating group, with knowledge and experience in the management of infectious diseases in ED, conducted a round of voting to a questionnaire of 18 issues grouped into three sections: 1) identification and stratification of the severity; 2) diagnosis and treatment; 3) management.

Conclusions. A monitoring system and proper training of the entire healthcare team are required, as well as extensive knowledge on these issues, to ensure adequate and effective care for these patients. It is essential to educate and train all health staff, especially in the ED, because it is the initial point of contact for most patients with an infection. The experts established proposals based on survey questions and the discussion.

Key words: Infection, Sepsis, Emergency

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Cuestiones claves en la atención del paciente infectado en Urgencias

RESUMEN

Objetivo. Elaborar un conjunto de recomendaciones basadas en la opinión de expertos en medicina de urgencias sobre aspectos claves relacionados con la atención del paciente con sospecha de infección en los servicios de urgencias.

Metodología. El estudio se desarrolló en tres fases: 1) Diseño de un cuestionario por un grupo coordinador; 2) Realización de una encuesta para conocer la opinión de los profesionales en urgencias y emergencias sobre las cuestiones formuladas por el grupo coordinador; 3) Elaboración de una serie de recomendaciones basadas en las respuestas al cuestionario y su posterior discusión.

Resultados. Un grupo de 28 expertos procedentes de distintos servicio de urgencias hospitalarios españoles, así como 5 miembros del grupo coordinador, formado por médicos con experiencia en urgencias y patología infecciosa, realizaron una ronda de votación a un cuestionario de 18 preguntas clasificadas en tres bloques: identificación y estratificación del paciente infectado, diagnóstico y tratamiento, y gestión hospitalaria.

Conclusiones. Para garantizar una atención adecuada y eficaz de estos pacientes se requiere una atención estructurada y un entrenamiento adecuado de todo el equipo sanitario, así como un amplio conocimiento en estos temas. Resulta fundamental educar y concienciar a todo el personal sanitario especialmente en los servicios de urgencias, punto de contacto inicial de la mayoría de los pacientes que padecen una infección. En base a las preguntas y su discusión, se consensuaron una serie de propuestas.

Palabras clave: Infección. Sepsis. Urgencias. Identificación precoz.

INTRODUCTION

Infectious diseases represent a major health problem in the world. They are associated with increased morbidity and mortality in all health settings. In Spain, they are one of the main causes of admission and mortality and represent 15% of hospital emergencies attended[1]. It is important to highlight that there has been an increase in the prevalence of infections in the last years. Also, there has been a change in the infected patient profile showing an increase of age, number of comorbidities, and risk factors for multidrug-resistant microorganism (MDRO) and sepsis syndrome.

The new definitions of sepsis and septic shock reflect the importance of early recognition of patients with severe infection. The criteria for systemic inflammatory response syndrome (SIRS), although repeatedly challenged on its non-specificity, may guide physicians to identify an infectious process in progress. The concept of "severe sepsis" is no longer part of the new classification. Hypotension and serum lactate levels above 2 mmol/dl support the new criteria for septic shock, reflecting metabolic and cellular abnormalities of sepsis[2]. The early prescription of antibiotic treatment and hemodynamic resuscitation, and proper monitoring are key to decrease mortality related to this process[3,4].

Moreover, inadequacy of antibiotic treatment in the infected patient may lead to an increase in the length of hospital stay, and therefore costs associated, and also in the mortality in critically ill patients[5,6].

Taking into account the above mentioned, objective was to establish a set of recommendations, by consensus of Emergency Medicine (EM) experts, on the identification, diagnosis, immediate treatment and management of adult patients with acute infection attended in Spanish emergency departments (EDs).

METHODOLOGY

The study was divided into three phases: 1) To design a questionnaire by a coordinating group; 2) To conduct a survey in ED physicians in order to know their opinion on the issues raised by the coordinating group; 3) To develop a number of recommendations based on the responses to the questionnaire and their subsequent discussion (figure 1).

In the first phase, a coordinating group of 5 members was formed. They met the following requirements: having more than 3 years of experience as ED physician, being member of an infectious diseases hospital commission, and having proven practice in non-invasive hemodynamic monitoring procedures. The tasks of the coordinating group were to prepare the questionnaire, select the expert group, set up the timetable, collect and analyse the results, and formulate the final recommendations. For the design of the survey questions, a literature search of the most relevant articles in the last 5 years on infectious diseases and ED topics was performed. After examining the selected publications, the coordinating group formulated

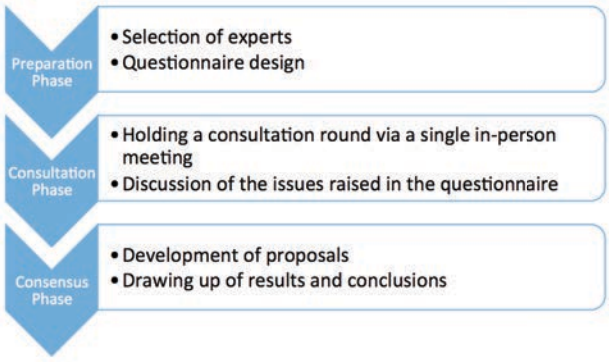

Figure 1 | **Systematization of the Method Used**

18 questions in 3 specific blocks in relation to acute infection process in the EDs: 1) identification and stratification of the severity; 2) diagnosis and treatment; 3) management.

Regarding the second phase, a group of 28 experts of EM physicians was formed, representing the vast majority of the Spanish Autonomous Communities, with knowledge and experience in the management of infectious diseases in ED. An expert meeting took place in April 2016, in which the survey was conducted through a closed anonymized electronic system. Subsequently, an open discussion was held regarding the responses.

Concerning the third phase, the coordinating group summarized the survey results and the discussion in a manuscript. Once the document was drafted, it was sent to all the experts for discussion and all participants approved the final version.

RESULTS

Table 1 shows questions and results of the survey conducted.

Block I. Identification and Stratification of Severely Infected Patients

With regard to the first question, the majority of experts said that the most vulnerable patients, who face the highest probability of error in identifying the symptoms associated with suspected infection, are the older patients. In relation to the second question, 90.9% of the experts believed that the new criteria should not replace the current ones until further evidence for the strategies are established in each centre. For the third question about classical criteria for sepsis, most of the consulted specialists argued that the use of such criteria is still useful in medical care, while 24.2% thought that they lack utility. Concerning the fourth question, 97.0% of the experts argued that it is necessary to adopt the sepsis code in EDs. Respect to triage systems, 60.6% affirmed that they are insufficient for proper stratification of infected patients. Lastly, 75.8% of the respondents use lactate as the primary prognostic biomarker of 30-day mortality.

Block II. Diagnosis and Treatment

Regarding empirical prescription of treatment against MDRO, 60.6% of the ED physicians argued that its coverage in community infections should only be considered in exceptional cases. For 54.5% of the experts, procalcitonin (PCT) is the most useful biomarker in the management of infected patients, and 97% of the total believed that it is necessary to have rapid etiological diagnostic techniques. In relation to the fourth question, 60.6% of the ED physicians would choose carbapenems, while 33.3% would prefer ceftolozane/tazobactam to treat a severe infection with suspected beta-lactamase producing Enterobacteriaceae in a setting with high resistance to carbapenems. In the fifth question, 78.8% of the experts suggested the need to administer, depending on the site of infection, the first dose of antibiotics intravenously prior to ED discharge.

With regard to delayed prescription, 21.2% stated that this may sometimes be useful in EDs. Respect to the infection site most beneficiated from new emerged antimicrobials, 45.5% of experts said it would be skin and soft tissue infections (SSTI), while a 42.4% of them considered the intra-abdominal infections. A 90.9% of the respondents suggested that it is necessary to assess the extension of antimicrobial spectrum in patients with severe comorbidity. About the peripheral use of norepinephrine, 78.8% of experts initially used it by peripheral access. Lastly, 66.7% monitored of hemodynamic response to therapy by measuring arterial pressure.

Block III. Infection Management

In the first question, there was controversy among respondents as to whether one should establish different circuits for the care of infected patients, even though 54.5% opted for the affirmative response. In reference to isolation circuits, 93.9% of the participants believed that it is necessary an isolation circuit in the EDs with a separate entrance to the centre. A 51.5% of the respondents affirmed that it is important the 24-hour presence of a microbiologist in the hospital. A 54.5% of experts said that hospitalization is the main cost associated element in the infection process, while a 45.5% of them considered it to be attributed to treatment failure. A 90.9% of the ED physicians found the short-stay units and outpatient parenteral antimicrobial therapy (OPAT) programs very useful and effective for the care of these patients.

DISCUSSION

Block I. Identification and Stratification of Severely Infected Patients

Advanced age is associated with an increased of the vulnerability to infection. Also, it is common in this age group to find an atypical clinical presentation that leads to an increased risk of delayed diagnosis and inadequate treatment, and therefore, worse short-term outcomes[7]. This aspect is interesting given that the vast majority of the experts thought that the older are a high-risk group of patients because they are frequently associated with significant comorbidity and age-related immune changes. Thus, they constitute the group of patients with higher risk for errors during identification in EDs, followed by those with clinical or therapeutic immunosuppression.

The consensus document that establishes the new definitions of sepsis[7] recognizes the need to modify the concept of sepsis, which is defined as an organic life-threatening dysfunction caused by a state of deregulation of the host response to infection. The new definitions of sepsis and septic shock reflect the importance of early recognition of patients with potentially fatal infection. The criteria for SIRS is considered to still be able to guide clinicians to identify a potential overall impact on an infection[8]. Despite the emergence of new definitions, experts believe that the SIRS should continue to be implemented in the nursing triage and the *Quick* SOFA (qSOFA) should be added to the first medical assessment. Also, they suggest that qSOFA should be validated in prospective studies and in special populations before eliminating the concept of SIRS. In addition, a specialized team, with skilled staff trained, is necessary in the triage when implementing the detection of sepsis.

The Sepsis Code project[9] aims to improve patient care, optimizing the identification and action times to achieve a reduction in mortality associated with this process. Another objective is to improve the use of human and material resources, reducing hospital length of stay and associated costs. The majority of the participants said that it is necessary to adopt this Sepsis Code in emergency care, and that it should also be implemented in pre-hospital emergencies.

The majority of the experts said that early administration of intravenous broad-spectrum antibiotics would be crucial during the pre-hospital care. For this, it is necessary to provide the medical emergency system with the necessary tools to prescribe the antibiotic treatment, after taking microbiological cultures, in the first hour. This issue may become particularly important in septic shock patients with prolonged transport to the hospital. Therefore, it is still necessary to universalize criteria to ensure that the Sepsis Code is suitable in all settings. Furthermore, special emphasis was placed on the importance of the collaboration of all professionals involved in the management of sepsis in order to achieve its implementation in all levels of healthcare.

The majority of the participants stated that current triage systems are not good enough for the risk stratification of infected patients. This may be especially complex and less reliable in older patients with severe infection because this age group may present more atypical clinical signs and symptoms due to age-related physiological changes, comorbidity and polypharmacy[10,11]. Thus, the importance of the measurement of respiratory rate to minimize the underestimation of patients with severe infection.

Lastly, it was pointed out that biomarkers of inflammatory response and infection have positioned themselves as helpful tools for ED physicians when making vital decisions. The most representative ones are PCT, C-reactive protein (CRP) and lactate[12]. More than half of the respondents use lactate as the

Table 1 Survey Questions and Results

Block 1. Identification and Risk Stratification of Severely Infected Patients	N (%)
1. What is the most vulnerable population group that faces the highest probability of error during identification in the ED?	
Patients with significant comorbidity	3 (9.1)
Immunosuppressed patients	1 (3)
Elderly patients	29 (87.9)
2. How will the new definitions of sepsis affect the management of patients?	
We should forget the SIRS and use the SOFA	2 (6.1)
No way, we must use only the SIRS criteria	1 (3)
Continue using SIRS and add SOFA in the assessment	30 (90.9)
3. Are the classical criteria for sepsis useful?	
Yes, except in elderly patients	5 (15.2)
Yes, except in immunosuppressed patients	1 (3)
Yes	19 (57.6)
No	8 (24.2)
4. Is adopting a sepsis code necessary in emergencies?	
Yes	32 (97)
No	1 (3)
5. Are standardized triage systems useful in the risk stratification of infected patients?	
Only Manchester	1 (3)
None	20 (60.6)
SET	0 (0)
Both	12 (36.4)
6. What is the prognostic biomarker most widely used in routine clinical practice?	
CRP	2 (6.1)
PCT	6 (18.2)
Lactate	25 (75.8)
Block 2. Diagnosis and Treatment	
1. Should we consider the etiologic diagnosis of multidrug-resistant microorganisms in community-acquired infections?	
Yes, but only in some sites of infection	4 (12.1)
Yes, but only regarding those that have received recent antibiotic therapy	7 (21.2)
No, never	2 (6.1)
As an exception, since it is very rare	20 (60.6)
2. What is the most useful biomarker in the management of infected patients?	
CRP	6 (18.2)
PCT	18 (54.5)
Lactate	9 (27.3)
3. Do you consider it necessary to implement rapid etiologic diagnostic techniques?	
Yes	32 (97)
No	1 (3)

Table 1 Survey Questions and Results (cont.)

4. In an environment with high rate of resistance to carbapenems, would you modify your choice of antibiotherapy if you suspect an infection by extended spectrum beta-lactamases producing Enterobacteriaceae?	
Yes, I would change it to piperacillin-tazobactam	2 (6.1)
Yes, I would change it to ceftalozane-tazobactam	11 (33.3)
No, I would keep the carbapenem	20 (60.6)
5. Is it necessary to administer the first dose of intravenous antibiotics before discharging infected patients from the emergency department?	
It is only necessary in some sites of infection	26 (78.8)
Yes, always	1 (3)
It is not necessary as the patient (getting discharged) is not in a serious condition	6 (18.2)
6. Is a deferred prescription suitable?	
Yes, though only on rare occasions	7 (21.2)
No, never	26 (78.8)
Yes	0 (0)
7. Which site of infection do you think will benefit the most from new antimicrobial agents against gram-positive and -negative bacteria?	
I don't see its place in emergencies	1 (3)
Skin and soft tissue infections	15 (45.5)
Pneumonia	1 (3)
Urinary tract infection	2 (6.1)
Abdominal infection	14 (42.4)
8. Is it necessary to assess the administration of a broad-spectrum antimicrobial in patients with severe comorbidity?	
Yes, because they are high-risk patients	30 (90.9)
Not only for that reason	1 (3)
No, but I would consider the potency	2 (6.1)
9. Can noradrenaline be administered peripherally?	
Yes	26 (78.8)
No	7 (21.2)
10. What do you use to monitor hemodynamic response to therapy?	
Arterial pressure	22 (66.7)
Lactate	9 (27.3)
Ultrasound	2 (6.1)
Block III. Infection Management	
1. Should different circuits be established for the care of infected patients?	
Yes	18 (54.5)
No	15 (45.5)
2. Do you think it is necessary for the isolation circuit to have a separate entrance to the centre?	
Yes	31 (93.9)
No	2 (6.1)
3. Is it necessary to have a 24-hour on-site microbiologist present in the hospital?	
Yes	17 (51.5)
No	16 (48.5)

Table 1 Survey Questions and Results (cont.)

4. Which element leads to increased spending in the process of an infection?	
Hospitalization	18 (54.5)
Treatment failure	15 (45.5)
5. Do you believe that short-stay units and/or home care units are useful in the management of infected patients?	
Not very useful	1 (3)
Somewhat useful	2 (6.1)
Very useful	30 (90.9)

SIRS: Systemic Inflammatory Response Syndrome; SOFA: Sequential Organ Failure Assessment; CRP: C-Reactive Protein; PCT: Procalcitonin

primary biomarker for risk stratification of patients, due to its utility, accessibility and immediacy.

Block II. Diagnosis and Treatment

Bacterial resistance is a first magnitude problem. Despite the number of new antibiotic molecules available, MDRO are increasingly emerging. The production of extended spectrum beta-lactamases (ESBL) is currently the most important problem of resistance among Enterobacteriaceae. These microorganisms may cause nosocomial infections although they are also isolated in out-hospital patients[13]. The frequency of this situation may be higher in patients with serious infections who receive inappropriate empirical treatment. Therefore, the identification of the factors, which predict the presence of infections by MRDO, is important to offer early and appropriate antibiotic treatment[14].

ED physicians argued that methicillin-resistant *Staphylococcus aureus* (MRSA) empirical coverage should only be considered occasionally in community patients. However, it should not be forgotten that MRSA microorganisms are present in 20% of staphylococcal infections[15]. Furthermore, it has been documented gram-positive isolates, usually *Staphylococcus* spp. and *Enterococcus* spp., with elevated MICs to linezolid, in Spanish critical patients[16].

Tedizolid is a new antibiotic from the family of oxazolidinones, indicated for SSTI treatment in adults, including those caused by MRSA. Tedizolid could be useful in SSTI instead of linezolid in patients with thrombocytopenia or in those who are at risk of developing it during treatment. This group includes those with vitamin B12 deficiency, myelodysplastic syndrome, expectation of prolonged duration of treatment, chronic liver disease, cancer, previous use of vancomycin, the presence of a low platelet count before the initiation of treatment, and low body mass index[17]. Another possible alternative would be ceftaroline, a fifth-generation cephalosporin with extraordinary affinity for PBP2a, which gives it high activity against MRSA, as well as all the safety-related advantages of being a beta-lactam[18]. Recently, dalbavancin has been launched on the Spanish market. This is an antibiotic also useful in SSTI, which belongs to the group of semisynthetic lipoglycopeptides structurally related to teicoplanin. It is an antimicrobial with a long half-life that can be administered in a single dose of 1500 mg. It provides a dosage facility advantage that would potentially reduce the risk of complications associated with multiple-dose parenteral therapy and facilitate outpatient management[19,20].

Moreover, MRDO gram-negative bacteria are a serious health problem worldwide because of the severity infections that they can cause and the difficulties in establishing proper empirical treatment. ESBL production is the most important problem of resistance among Enterobacteriaceae, which cause nosocomial infections, but are also frequently isolated in community patients[13]. There are other therapeutic limitations against resistant gram-negative bacteria, such as carbapenemase-carrying Enterobacteriaceae or glucose-nonfermenting gram-negative bacilli, such as *Pseudomonas aeruginosa* or *Acinetobacter baumannii.*

A new beta-lactam, ceftolozane/tazobactam, has recently become available. This is a derivative of ceftazidime associated with a beta-lactamase inhibitor with higher activity against *P. aeruginosa*[21]. It is indicated for the treatment of adults with complicated intra-abdominal and complicated urinary tract infections, including pyelonephritis. It has in vitro activity against ESBL-producing microorganisms and against multi-drug resistance *P. aeruginosa.* ED physicians have considered that it could be useful against these pathogens in environments where there is a high rate of resistance of *Pseudomonas* to carbapenems, or where there is a high incidence of infections by carbapenemase-carrying strains, in order to reduce the use of carbapenems. In addition, there are other therapeutic alternatives against ESBL strains such as tigecycline or fosfomycin, and even the combination of penicillinase with penicillins (piperacillin/tazobactam or amoxicillin/clavulanate) in the treatment of urinary sepsis with low MIC.

The group of experts agreed that, in order to broaden the spectrum of antimicrobials and provide coverage against MDRO, the site of infection, risk factors, comorbidity and the severity of the process, as well as pharmacokinetic and pharmacodynamic parameters (PK/PD), should always be considered. For the patients' severity assessment, the degree of comorbidity should be added to clinical and laboratory criteria. It has been published that patients with a Charlson index score higher than 2 have poorer short- and long-term prognosis[22].

Therefore, an empirical treatment error in these patients could further worsen clinical outcomes. Most experts agreed that it would be necessary to assess and extend the antimicrobial spectrum or to use more powerful antibiotics in patients with significant comorbidity. This may be useful to achieve a greater log reduction in the shortest possible time and therefore an early defervescence of the episode, reducing the period in which the patient comorbidities are destabilized, and decreasing the risk of revisit to the ED[23]. This is the main justification for using combination therapy in severe infections. This leads to reach antibiotic synergy, a greater spectrum, an early log reduction and prevention of MDRO emergence.

It is widespread that the best antibiotic prescription strategy is the obtainment of adequate samples for culture, especially when is necessary to use broad-spectrum antibiotics, and then the early deescalation in accordance with the results of the cultures taken in EDs. This attitude may protect both the patient and the community preserving the ecological niche.

The development of rapid microbiological tests could provide information in the first hours of attendance to help in decision-making[24]. Currently, few centres have these techniques for rapid etiologic diagnosis available to determine the aetiology of the infection. The rapid flu test and urinary antigens against *Legionella pneumophila* and *Streptococcus pneumoniae* are the most widespread tests in EDs. The implementation of rapid diagnostic techniques will always take into account the cost-benefit factors. Also, it will be necessary to establish a protocol for the previously selected patients through an epidemiological survey, in order to reduce antibiotic selective pressure and unnecessary testing costs. As for taking blood cultures, the majority of the respondents answered that the extraction depends on the site of infection but above all they serve to determine the diagnostic and therapeutic decisions, especially in sepsis and septic shock patients. Therefore, the need to draw blood cultures in all sites of infection was considered, although it was recognized that probably a higher number of blood cultures than necessary are taken in the EDs.

It is well known the difficulty of finding a biomarker that allows early diagnosis of sepsis due to the complexity of the pathophysiology of this process[25,26]. Sepsis diagnosis remains a challenge, mainly in special groups of patients. The majority of the participants stated that the most useful diagnostic biomarker is PCT because it is more sensitive than CRP, especially in bacterial infections. They considered it to be especially useful in patients with uncertain diagnosis, and for the monitoring of therapeutic response in critically ill patients. Some of the professionals supported the use of CRP and lactate due to the diagnostic limitations of their workplace.

There was a total agreement regarding the need to administer the first dose of antibiotics prior to discharge from ED, although this need will depend on the site of infection. Consequently, this was required in community-acquired pneumonia, where the guidelines clearly recognize this need[27].

Delayed antibiotic prescription entails providing a prescription for an antibiotic agent and instructing the patients to take it only if their symptoms do not improve or worsen in the next days after the physician attendance. This is an administration regimen that may reduce unwarranted use of these drugs, contributing to their responsible use[28]. The majority of the participants considered appropriate this strategy, mainly in outpatient. Although information regarding the initiation of antibiotic therapy must be previously provided to the patient.

Finally, there was a general agreement that crystalloids are the best choice for hemodynamic resuscitation, and furthermore, there are several studies that support their use[29]. According to current guidelines, dopamine and noradrenaline should be the first-line vasopressors[30]. However, there are observational studies that have associated a higher rate of arrhythmias[31] and mortality in patients treated with dopamine than in those treated with norepinephrine[32]. Therefore, the latter is preferable as vasoactive treatment of choice. The majority ED physicians use norepinephrine through peripheral access although its peripheral administration increases the risk of adverse effects. However, the infusion through proximal peripheral line (antecubital fossa or external jugular vein) is unlikely to cause any problem during the first 4 hours in critically ill patients[33]. Subsequently, it is possible to continue its infusion placing a central line.

In regard to monitoring the hemodynamic response to therapy, the majority of them said that they perform it through arterial pressure. There was little experience regarding control through non-invasive techniques such as ultrasound of the vena cava or the carotid artery, which tools that have proved to be useful in predicting response to volume overload or the need to initiate amine therapy[34].

Block III: Infection Management

Emergency care is based on the principle of giving priority to the most severely ill patients. Thus, some circuits of patients are defined in function of the risk stratification at ED arrival. These circuits have different diagnostic and therapeutic resources and therefore different established length of stays in the ED[35]. There was controversy among the respondents regarding the circuits that there should be established for the care of infected patients. Most experts declared that both patients with sepsis and those with septic shock should be treated in a shock room, which would allow immediate and efficient care in EDs[36].

According to the need to establish isolation circuits differentiated from the rest of them, triage had a special relevance due to the infections transmitted by respiratory route. The entrance to this circuit should be separated from others, especially in cases of epidemics of serious infections[37].

Currently, few Spanish hospitals have a microbiologist and/or consultant for infectious diseases, either on-site or locally available, for 24 hours a day. The majority of the participants believed that a 24-hour on-call microbiologist is necessary, whereas only a minority believed it is necessary to have a 24-hour on-call infectious diseases consultant.

Another important aspect is the increase in healthcare

Table 2 Recommendations of the Working Group.

1	Special care should be taken in the care of elderly patients with severe comorbidity, since both are factors associated with an increased risk of poor results due to the difficulty of stratifying the risk for patients with this profile.
2	The new defining criteria of sepsis should be incorporated into routine clinical practice, but without eliminating the previously existing detection criteria. It is essential to develop a sepsis code as it has been shown to be a useful tool in improving the healthcare outcomes of patients with sepsis.
3	There is a growing problem of multidrug-resistant microorganisms infecting patients from the community, so the risk of infection by them should always be assessed when deciding on the initial empirical treatment.
4	In order to broaden the spectrum of antimicrobials, one should take into account the site of infection, risk factors, comorbidity and severity of the process, as well as pharmacokinetic and pharmacodynamic parameters of the antibiotic.
5	It would be advisable to implement microbiological techniques for rapid diagnosis with regard to proper selection of the initial antibiotic. Given the current limited availability of these, the best strategy is obtaining adequate samples for culture, especially in patients with whom it is necessary to use broad-spectrum antibiotics, for then proceeding to early deescalation.
6	The most widely used biomarker in emergencies is lactate, which is considered the best for prognostic stratification of patients. PCT is the best biomarker from the diagnostic point of view.
7	The perfusion of norepinephrine may initially be administered peripherally, but for no more than 4 hours.
8	Hospitalization is the element that generates the most spending in the treatment of an infection, thus strategies should be established to reduce hospital stay.
9	Having isolation circuits differentiated from the rest of the emergency care circuits is essential.
10	Both Short-Stay Units and Home Care Units are alternatives to conventional hospitalization that are useful in managing infected patients and do not increase the risk of poor results.

costs in Western countries, which is a concern in terms of economic and health policy. Several studies describe the relationship between healthcare costs and their determinants such as the aging population, the adoption of new technologies and therapeutic improvements, among others[38,39]. Most studies have argued that hospitalization is the main element associated with the costs related to infection treatment, because length of hospital stay, especially if prolonged, generating negative effects on the healthcare system. However, the majority agreed to take into account also the costs in the process of selecting antibiotics to treat a particular infection, but never to place the costs factor above their efficacy and benefits for the patient.

Finally, it should be pointed out that hospital EDs have demonstrated significant progress in the adoption of management measures to alleviate the problems of overcrowding, especially in relation to lack of available hospital beds. In this sense, alternatives have been developed to conventional hospital units, including short-stay units (SSUs) and home care units[40]. The majority found that such units are very useful for the management of infected patients, taking into account that these patients will be rapid discharged with a specialized medical team.

CONCLUSIONS

The importance of correct knowledge and management of patients with suspected infection, sepsis or septic shock lies in the high morbidity and mortality associated with these conditions. For this reason, a monitoring system and proper training of the entire healthcare team are required, as well as extensive knowledge on these issues to ensure adequate and effective care for patients. Finally, it is essential to educate and train all health staff, especially in the ED, because it is the initial point of contact for most patients with an infection. The experts established proposals based on survey questions and the discussion showing in the table 2.

*ADDENDUM

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CONFLICTS OF INTEREST

None

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