

## Selected Topics: Prehospital Care



### A SURVEY OF THE COMPETENCY OF AMBULANCE SERVICE PERSONNEL IN THE DIAGNOSIS AND MANAGEMENT OF SEPSIS

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**Abstract—Background:** Few studies have evaluated the current status of knowledge of sepsis in ambulance service personnel. **Objective:** Our aim was to ascertain the levels of competency and proficiency of ambulance service personnel in the diagnosis and management of severe sepsis. **Methods:** A questionnaire was submitted to a sample of 208 participants in a professional ambulance service conference, and was recovered on site. The study probed eight areas of sepsis diagnosis and management based on modifications of a questionnaire used in a previous study. **Results:** The term *sepsis* in Japanese, *Haiketsushou*, was familiar to 99% of Japanese certified emergency life-saving technicians (ELST) (Group I) and to 92% of noncertified ambulance service personnel (Group II), although 15% of participants in Group I and 44% in Group II ignored the meaning of sepsis. The definition of sepsis as “body’s response to infection,” “blood poisoning,” or “shock due to bacteria in blood” were selected by 17%, 16%, and 37%, respectively, in Group I, and 4%, 6%, and 22%, respectively, in Group II. The mortality associated with sepsis was underestimated by 57% in Group I and 78% in Group II. Vital signs raising a suspicion for sepsis and their pertinent ranges were correctly chosen by only 50% of certified ELST. Hypothermia was prominently undervalued as a sign raising the suspicion of sepsis. **Conclusions:** Insufficient knowledge and perception for sepsis in Japanese ambulance services is revealed. A higher level of onsite or formal postgraduate education needs to be provided with a view to improve the prehospital management of sepsis. © 2015 Elsevier Inc.

**Keywords—**sepsis; medical education; ambulance service; emergency life-saving technician

### INTRODUCTION

Sepsis is a potentially life-threatening disorder, which, when it occurs out of the hospital, often requires emergency transport by ambulance (1). A recent study reported that > 40% of all patients hospitalized for severe sepsis had been transported by emergency services, with the number of cases increasing rapidly (1). However, it is not clear that the paramedical communities are thoroughly familiar with the various issues associated with the characteristics of sepsis and its management. The lack of knowledge might be a source of inaccurate and delayed initial recognition and diagnosis of sepsis, delay in the hospitalization and treatment of patients, and, ultimately, mediocre clinical outcomes (2).

To the best of our knowledge, a single study, conducted in the United States (US), has focused on this issue (3). We developed the current survey to examine the level of knowledge and the perception of sepsis among Japanese ambulance service personnel.

### METHODS

The survey was organized to examine knowledge and perceptions regarding sepsis during a continuing education conference for ambulance service personnel held in January 2014 in Kyoto, Japan. The ambulance service is staffed by certified emergency life-saving technicians (ELST) and other personnel. ELST in Japan were allowed

to tracheally intubate give electrical defibrillation, establish intravenous access, and administer adrenaline and fluids only for victims with cardiopulmonary arrest under the supervision of a medical commander, but not for victims with shock at the time of this survey.

The printed questionnaire was distributed on site and gathered immediately after its completion by the conference participants. It included eight queries pertaining to sepsis, consisting in part of translations and modifications of a questionnaire used in earlier studies (4). In brief, the following questions were asked:

1. Have you heard of the term *sepsis*?
2. Have you heard of the term *Haiketsushou*?
3. Which, among the multiple choices listed below is the most accurate meaning of sepsis?<sup>3</sup>
  - An allergy
  - Bacteria
  - Blood poisoning
  - Bacteria in blood
  - Shock due to bacteria in blood
  - Infection
  - Infection of a wound
  - Infection of a tissue
  - Inflammation
  - The body's response to infection
  - Pus discharge
  - Other
  - Unknown
4. Where did you hear about sepsis? Several answers could be selected from multiple choices.
  - Biology lessons
  - At school
  - At college
  - At university
  - Friend/relative
  - Friend/relative has been affected
  - I have personally been affected
  - In the media
  - On the internet
  - Medical person/health professional in the family
  - I am a doctor/nurse/other health professional
  - Other
  - None of these
  - Do not know
5. Check the mortality associated with each condition?
  - Conditions
    - Ruptured abdominal aneurysm
    - Severe sepsis
    - Stroke
    - Acute myocardial infarction
  - Mortality
    - 2.7%–9.6%
    - 9.3%

- 28%–50%
  - 50.0%–73.3%.
6. Have you ever told the command station “this patient is developing sepsis”?
  7. Which vital signs do you consider important when suspecting sepsis? Assign a “high” or “low” threshold to each sign.
  8. Which of these interventions is (are) important in the management of sepsis? (select all that apply):
    - Fluid resuscitation
    - Antimicrobials
    - Steroids
    - Glucose infusion
    - Immunoglobulin
    - No opinion.

With this questionnaire, the investigator probed the awareness and proficiency of the technician with respect to the disease and pertinent terminology, definitions, use of vital signs, management and complications. The Ethics Committee of Kyoto Medical Center approved for this study. Informed consent of using the data was obtained from each participant when the survey was performed. The results are expressed as n (%) or median (range).

## RESULTS

Out of the sample of 208 ambulance care personnel among 232 participants at the conference, 208 (100%) completed the questionnaire, 94 (45%) of them were board-certified ELST (Group I) and 114 (55%) were noncertified ambulance service personnel and students (Group II).

The responses to the questionnaire are summarized in the Table 1.

**Table 1. Familiarity With Sepsis and its Complications**

	Group I (n = 94)	Group II (n = 114)
Participant familiar with the term <i>sepsis</i>	11 (12)	5 (4)
Participant familiar with the term <i>Haiketsushou</i>	93 (99)	105 (92)
Source of information from school	34 (37)	32 (28)
Sepsis means the response of the body to infection	16 (17)	4 (4)
Sepsis means identification of bacteria in blood	35 (37)	23 (21)
Sepsis means blood poisoning	15 (16)	7 (6)
Sepsis means shock due to bacteria in blood	35 (37)	25 (22)
Do not know the meaning of sepsis	14 (15)	50 (44)
Mortality associated with severe sepsis is 28%–50%	11/77 (14)	12/91 (13)
Mortality associated with severe sepsis is 2.7%–9.6% or 9.3%	44/77 (57)	71/91 (78)

Data are presented as n (%).

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