



Original article

Availability and practice of bedside ultrasonography in emergency rooms and prehospital setting: A French survey



Disponibilité et pratique de l'échographie clinique en médecine d'urgence : enquête en France

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ABSTRACT

Introduction. – The utility of bedside ultrasound (US) performed by emergency physicians has been proven for multiple purposes. There are no data about this technique in emergency departments (ED) in France. The primary objective is to determine the availability of ultrasound device (UD) in EDs and in prehospital settings in France. Minor objectives are to determine the number and type of UD, the most current applications of US and the factors correlated with availability of UD in the setting of emergency medicine.

Methods. – This is a cross-sectional, descriptive, multicenter survey from December 2010 to June 2011, including all EDs and prehospital units in France. A questionnaire was sent by e-mail. Non-responders were contacted by telephone with one recall.

Results. – The response rate was 74% (327/440) for EDs and 73% (278/379) for prehospital units. A UD is available in 52% (171/327) (CI 95% [46; 58]) of EDs and in 9% (25/278) (CI 95% [5; 13]) of prehospital units. Among departments having no access to UD, 29% of EDs and 12% of prehospital units have plans to implement emergency physician-performed US. The most common US applications are focused assessment with sonography for trauma and pleural exams.

Conclusion. – Availability of UD in French public hospital EDs is 52% and 9% in prehospital units. Despite the progressive expansion of the technique over the last years, bedside ultrasonography is not yet completely integrated in the physical examination of the patient in an emergency situation in France. A reassessment will be required to confirm the current trend of expansion.

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R É S U M É

Introduction. – L'intérêt de l'échographie clinique en médecine d'urgence a été validé dans de nombreuses applications. Il n'y a pas de données sur sa diffusion dans les services d'urgence (ED) en France. L'objectif principal de notre étude est de déterminer la proportion de service d'urgence intra (SU) et préhospitalier (Smur) français ayant la disponibilité d'un échographe pour les médecins urgentistes. Les objectifs secondaires sont de déterminer le nombre et le type d'échographe, les applications d'échographie clinique les plus utilisées et les facteurs associés à la disponibilité d'un échographe.

Méthode. – Il s'agit d'une étude transversale, descriptive, multicentrique réalisée entre décembre 2010 et juin 2011 dans tous les SU et Smur en France. Un questionnaire a été envoyé par e-mail. Les non-répondeurs ont été contactés par téléphone avec un rappel.

Résultats. – Le taux de réponse était de 74 % (327/440) pour les SU et 73 % (278/379) pour les Smur. Un échographe était disponible pour les médecins urgentistes dans 52 % (171/327) (IC à 95 % [46,58]) des SU et dans 9 % (25/278) (IC à 95 % [5,13]) des Smur. Parmi les services qui n'y avaient pas accès, 29 % des SU et

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12 % des Smur avaient des projets d'achats. Les applications les plus courantes étaient l'évaluation échographique des patients traumatisés graves et les échographies pleurales.

Conclusion. – Cinquante-deux pour cent des SU et 9 % des Smur avaient la disponibilité d'un échographe pour les médecins urgentistes. Malgré son déploiement au cours des dernières années, l'échographie clinique n'est pas complètement intégrée dans l'examen du patient d'urgence en France. Une réévaluation sera nécessaire pour évaluer la cinétique de diffusion de cette technique.

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1. Introduction

Point of care ultrasonography is available in various specialities [1]. Since the 1980s, emergency physician-performed bedside ultrasound (US) is widely used in many countries [2,3] and for multiple purposes: diagnoses, procedure guidance, treatment and monitoring of patients in emergency medical conditions [4]. US training is widely integrated in emergency medical education in France and in the United States [5].

In 1996, an international consensus conference described the focused assessment with sonography for trauma (FAST) as an integrated, goal-directed, bedside examination to detect abdominal, pleural or pericardial effusion, which is likely to be a marker of traumatic lesions [6]. From then on, the application of ultrasonography in emergency departments (EDs) has been extended to pleuro-pulmonary [7,8], cardiac [9] and transcranial Doppler US [10]. The latest guidelines of the American college of emergency physicians in 2008 included the diagnosis of intrauterine pregnancy, abdominal aortic aneurysm, deep venous thrombosis and hepatobiliary and urinary tract disease together with guidance for central venous cannulation [4].

The development of hand-carried ultrasonographic devices, originally used by the military [11], now allows the use of US in the prehospital setting. Some studies suggest that early out-of-hospital diagnosis in trauma patients optimizes initial treatment and orientation to the most appropriate hospital [12–14]. Others studies also suggest the usefulness of prehospital US in dyspnea, chest pain, cardiac arrest, abdominal trauma or procedure guidance [15,16]. Nevertheless, there is no evidence by randomized controlled trials (RCTs) that prehospital US improves treatment of trauma patients [17]. Different studies found an ED US availability of 94 % in Australia, 65% in Italy and 34% in the United States [18–20]. There seems to be a difference between the guidelines and the number of articles on clinical ultrasound in emergency medicine and the diffusion of this technology.

The aim of this study was to determine emergency physician's availability to perform US in EDs and in prehospital setting in France. Secondary objectives were identifying the number and type of ultrasound devices (UDs), the most current applications and the factors correlated with availability of UD in the setting of emergency medicine.

2. Methods

2.1. Study design

This was a cross-sectional, descriptive, multi-centre survey using a questionnaire including all EDs and prehospital units (PU) of public hospitals in France.

2.2. Objectives

The primary objective was to determine the availability of at least one ultrasound scan in the concerned units.

Secondary objectives were to determine:

- the total number and type of UD used in each unit. Type was defined as:
 - multipurpose: multipurpose transportable ultrasound,
 - portable: portable ultrasound,
 - hand-held: pocket sized ultrasound;
- the factors correlated with the presence of a UD;
- the number of clinicians trained in US. A trained physician was defined as a physician that had received proper ultrasound training;
- the most common US applications in EDs.

2.3. Population

We were able to identify all EDs of French public hospitals (metropolitan or nonmetropolitan) by a list available from the Fédération hospitalière de France. The list of PUs was established from Samu de France data. A total of 819 units were included: 440 EDs (52 academic hospitals and 388 general hospitals), 275 PUs (Smur) (4 academic hospitals and 271 general hospitals) and 104 PUs with departmental emergency regulation centre (Samu/Smur) (32 academic hospitals and 72 general hospitals). General hospitals are hospitals without medical university.

2.4. Survey

The survey was conducted from December 2010 to June 2011. A questionnaire was sent to participants primarily by e-mail with one recall. Non-responders were contacted twice by telephone.

The questionnaire included 28 items referring to 4 areas:

- type of hospital, type of unit, geographic location (for all);
- ED equipment, number of physicians and training (if type of unit was ED);
- PU equipment, number of physicians and training (if type of unit was PU);
- applications of US (for all).

2.5. Data analysis

Quantitative variables were expressed in mean (\pm average deviation) or median ([25th–75th] percentile) depending on their distribution (modal or not). Qualitative variables were reported as percentage. Chi² tests were used for categorical data (or Fisher's exact test if the conditions for validity of the Chi² test were not fulfilled). The odds ratios were expressed with 95% confidence interval (CI). Significance was defined as a two-tailed *P* value of < 0.05 . Statistical analysis was performed using SAS v 8.1 software (SAS Institute, Cary, NY).

3. Results

The overall response rate was 73%, including EDs and prehospital departments. Three hundred and twenty-seven of the 440 eligible EDs (74%) and 278 of the 379 PUs (73%) provided

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