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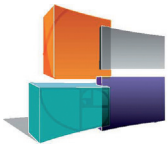

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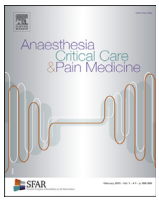

Editorial

Caring for severe trauma patients in France. A call for a national strategy?

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Severe trauma remains a major public health problem worldwide [1,2]. Although it may affect patients of both sexes and all ages, male and young subjects are the persons most often involved. In addition, young subjects suffer a greater number of injuries. In fact, severe trauma is the leading cause of death and disability among young adults, with dramatic consequences for their families. It is very difficult to mourn the sudden loss of a healthy child or young adult. Moreover, the costs of care, disability and loss of productivity for the community are highly elevated [3].

France is not spared by the burden of severe trauma. Like many other developed and less developed countries, the main cause is road traffic accidents (more than two-thirds of cases) followed by domestic accidents and sport accidents [4]. In 2017, at least 29,000 hospitalisations and 3600 deaths were due to road accidents in our country alone [5].

In response to this situation, several countries have implemented strategies to improve the prognosis of patients suffering from severe trauma. The organisation of care is essential and requires the coordination of many actors and resources, according to existing territorial and traditional constraints [3]. Different models of management have been developed, including both pre-hospital and hospital care. The pre-hospital "scoop-and-run" strategy is the approach in which the patient is transferred to the hospital as quickly as possible after having limited the care provided on the field to the strict minimum. It is associated with transfer of the patient to referral hospitals. This strategy was developed in the United States in the 1950s and is based on the experience of the US military during the Korean and Vietnam wars [5]. In this model, also known as the exclusive model, patients with major trauma are transported to a small number of high-level hospitals, called "trauma centers", which have all the resources necessary to manage seriously injured patients. Results have been significant, with a 20% reduction in mortality compared to conventional management. However, the main drawbacks include reduction in the skills of local hospitals and overload of trauma centres [6]. Another disadvantage is the prolonged transfer time of patients not always stabilised when the first referral centre is far from the accident scene.

French choices have differed for several reasons. First, the French pre-hospital model was developed to deal with all health problems, not just those related to severe trauma. Second, the mechanisms and nature of trauma and injuries vary considerably between countries. Many injuries in the United States result from penetrating trauma and require fast management by specialised surgical teams. In France, most injuries are due to blunt trauma requiring investigation and care by emergency and intensive care physicians, and only rarely surgical intervention. As a result, France has developed the "stay-and-play" strategy, which is more appropriate for wounded civilians. As part of this strategy, medical management of patients having suffered a major trauma begins in the field with an emergency physician or an anaesthesiologist. Physicians are incorporated into mobile intensive care units (MICU for Mobile Emergency and Resuscitation Service – SMUR for *Service Mobile d'Urgence et de Réanimation* in French) created by the French Ministry of Health in 1956 and composed of three people with a nurse and an ambulance driver [7]. Patients are stabilised on the scene before being transported to a hospital whose skill level corresponds to the nature of the injuries. In this approach, also known as the inclusive model, all hospitals within a region are included in a comprehensive system based on their resources, and they can accommodate trauma patients according to the level of care required.

Regardless of the choice of pre-hospital strategy (“stay-and-play” or “scoop-and-run”) or hospital model (exclusive or inclusive), a trauma system improves patients' vital or functional prognoses [8]. Many countries such as the United States, the United Kingdom [9], Germany [10] or Norway [11] have developed a nationwide trauma system. Surprisingly, there is no equivalent system in France, even though local networks have been built up over the last ten years. SOS-Trauma was the first to be created at the initiative of the Rhône-Alpes region and RESUVAL (*Réseau des Urgences de la Vallée du Rhône*), bringing together 35 hospitals since 2008. It was followed by the TRENAU (*Réseau des urgences des Alpes du Nord*), which cares for about 1000 victims per year [12], the *Centre d'Accueil des Polytraumatisés du Poitou-Charente* and the TraumaBase, which brings together several hospitals in the Ile de France region. These trauma networks have been designed as inclusive models, in which all regional resources are integrated,

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taking into account capacity, resources and proximity. The main goals are to define a patient's journey according to the severity of the trauma and the resources required, to share care guidelines, to collect data on trauma patients, and to improve medical care through active research strategies [4,12].

Hospitals included in the French networks are classified as Level I, II or III according to a French adaptation of the American classification, depending on the availability of specialised medical teams and technical facilities [13] and patients are referred according to the Vittel criteria. The main difficulty of the French system has consisted in combining the organisation of the American Trauma System with French expertise in pre-hospital medical care. This feature should actually be considered as strength, allowing patients to quickly benefit from the best medical strategy starting at the scene, including hospital orientation [13]. These organisations have been associated with a reduction in blunt trauma mortality [14], but there is not enough data to conclude that this model is more effective than the American one [8].

Even if the French model is successful, the absence of national coordination is a major limitation. The French system needs to be developed homogeneously at the regional level and organised at the national level. In this issue of the Journal, David and colleagues provide a detailed description of the different trauma network models available around the world and summarize the key points of establishment for each, including trauma system organisation, pre-hospital care and triage [13]. Each model differs significantly from the others and offers different advantages and drawbacks. Hospital classification, pre-hospital triage and patient referral are key points that need to be integrated and developed in establishment of a trauma system, and the authors stress that evaluation is essential to assessment of the maturity of the system and to improvement of its performance in terms of patient outcome.

Also in this issue of the Journal, Gauss and the *Groupe d'intérêt en traumatologie grave* (GITE) have elaborated 14 proposals designed to improve the management of major trauma patients in France over the next 10 years [15]. The main proposals involve creation of a national trauma patient registry and a national research program, and the development of standardised educational programs focused on team simulation and performance.

Finally, Gauss and colleagues and David and colleagues stress the desire of the physicians involved in the management of these patients to converge their networks. They also outline key points in the establishment and evaluation of future, regionally organised and nationally assessed trauma systems. With these proposals, they challenge French organisations to upgrade their networks, given that implementation will be not possible without the active participation of all stakeholders, professional actors, governmental institutions and civil society. But, while some difficulties remain, the goal is even greater: to optimise medical care of severe trauma patients in view of improving their outcome, with emphasis on survival. Ten years for a great but exciting challenge.

Disclosure of interest

The authors declare that they have no competing interest.

References

[1] WHO Guidelines for essential trauma care. Available at https://www.who.int/violence_injury_prevention/publications/services/guidelines_traumacare/en/ (Last access January 5, 2019).

[2] Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet 2017;390:1211–59.

[3] Tissier C, Bonithon-Kopp C, Freysz M. French Intensive care Recorded in Severe Trauma (FIRST) study group. Statement of severe trauma management in France; teachings of the FIRST study. Ann Fr Anesth Reanim 2013;32:465–71.

[4] Bilan définitif de l'accidentalité routière 2017 / Publications presse / Espace presse - Sécurité routière : Tous responsables n.d. http://www.securite-routiere.gouv.fr/medias/espace-presse/publications-presse/bilan-definitif-de-l-accidentalite-routiere-2017 (accessed January 7, 2019).

[5] Nathens AB, Brunet FP, Maier RV. Development of trauma systems and effect on outcomes after injury. Lancet 2004;363:1794–801.

[6] MacKenzie EJ, Jurkovich GJ, Frey KP, Scharfstein DO. A national evaluation of the effect of trauma-center care on mortality. N Engl j Med 2006;354:366–78.

[7] Dick WF. Anglo-American vs. Franco-German emergency medical services system. Prehosp Disaster Med 2003;18:29–35.

[8] Wilson SL, Gangathimmaiah V. Does prehospital management by doctors affect outcome in major trauma? A systematic review. J Trauma Acute Care Surg 2017;83:965–74.

[9] Moran CG, Lecky F, Bouamra O, Lawrence T, Edwards A, Woodford M, et al. Changing the system – major trauma patients and their outcomes in the NHS (England) 2008-17. EClinicalMedicine 2018;2(3):13–21.

[10] Sturm JA, Pape H-C, Dienstknecht T. Trauma care in Germany: an inclusive system. Clin Orthop Relat Res 2013;471:2912–23.

[11] Dehli T, Gaarder T, Christensen BJ, Vinjevoll OP, Wisborg T. Implementation of a trauma system in Norway: a national survey. Acta Anaesthesiol Scand 2015;59:384–91.

[12] David JS, Bouzat P, Raux M. Evolution and organisation of trauma systems. Anaesth Crit Care Pain Med 2018.

[13] Bouzat P, Ageron F-X, Brun J, Levrat A, Berthet M, Rancurel E, et al. A regional trauma system to optimize the pre-hospital triage of trauma patients. Crit Care 2015;19:111.

[14] Yeguiayan J-M, Garrigue D, Binquet C, Jacquot C, Duranteau J, Martin C, et al. Medical pre-hospital management reduces mortality in severe blunt trauma: a prospective epidemiological study. Crit Care 2011;15:R34.

[15] Gauss T, Balandraud P, Frandon J, Abba J, Ageron FX, Albaladejo P, et al. Strategic proposal for a national trauma system in France. Anaesth Crit Care Pain Med 2018.

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