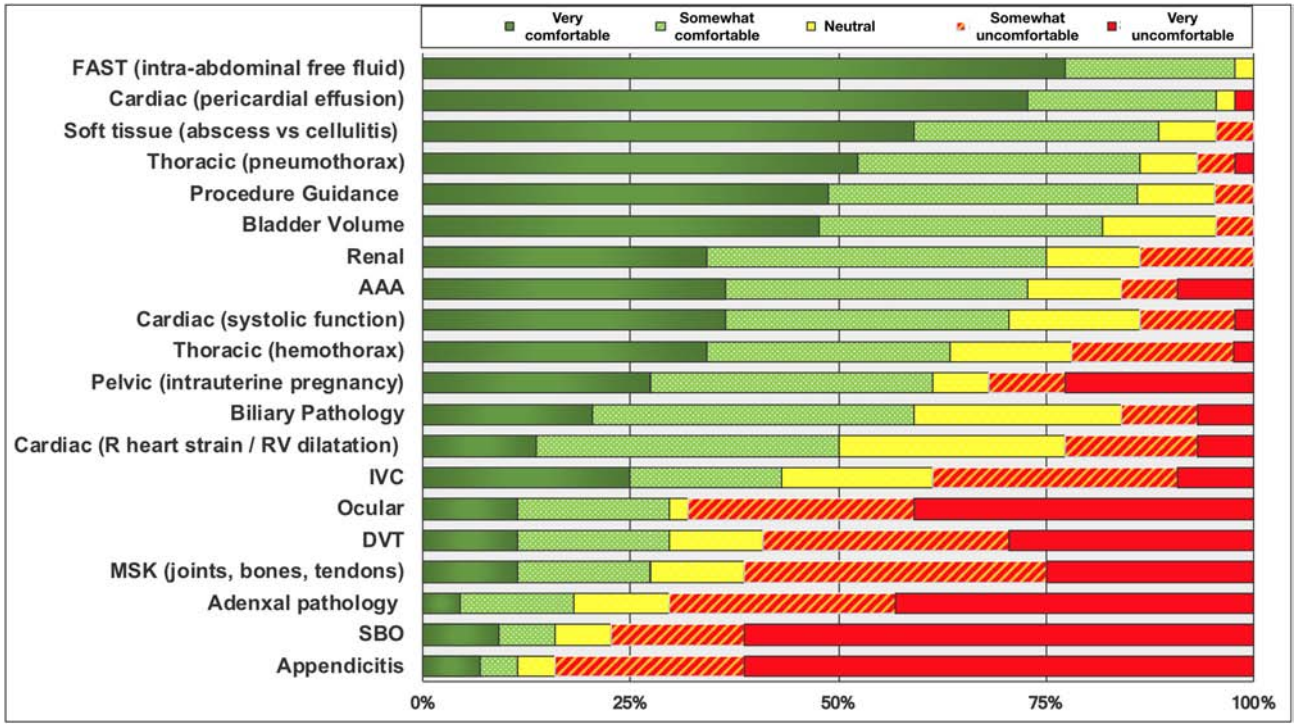

Fig. 2. Academic EM faculty comfort level with various POCUS applications.

Financial support

None.

Conflicts of interest

Drs. Liteplo, and Shokoohi report obtaining a grant from EMF and GE for ultrasound research. The timing of this grant did not overlap with the duration of the study.

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8 December 2018

https://doi.org/10.1016/j.ajem.2018.12.021

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Aortic dissection occurring while driving and road traffic accidents

Some human activities such as strenuous exercise and sexual intercourse are known to trigger spontaneous aortic dissection (AD) in vulnerable subjects [1]. In contrast, driving in itself is unlikely to trigger AD. Rather, most drivers who sustained AD just happened to be a driver by chance [2,3]. Nevertheless, information on the clinical picture of AD occurring while driving may be useful to emergency physicians, considering that drivers who sustain AD may cause road traffic accidents (RTAs) and potentially cause property damage, injury, or death to the driver or others on the road. The behavioral response of afflicted drivers, *i.e.*, how often drivers experiencing AD were able to avoid RTAs, has rarely been reported in the literature. After approval by our Institutional Ethics Committee, we conducted a single-center retrospective observational study to document the clinical characteristics, including behavioral response, of patients who sustained an AD while driving. We used a dataset of 417 non-traumatic AD patients (273 men and 144 women; mean age, 67.6 ± 13.2 years) who were admitted to our

emergency department (ED) between January 2011 and December 2017. Among them, 20 patients (19 men and 1 woman; mean age, 60.9 ± 8.7 years, Stanford type A: type B ratio = 12: 8) sustained an AD while driving, with an overall frequency of 4.8% (20/417). The response of 20 drivers after sustaining AD is shown in Fig. 1. Four drivers (20%) experienced a loss of consciousness (LOC), and subsequently, lost control of their vehicle, resulting in a RTA. While none of the four drivers sustained serious bodily damages after collision, all developed cardiac arrest by the time they arrived at our ED and could not be resuscitated. The other 16 drivers (80%) did not experience an LOC and were able to avoid an RTA. Five drivers kept driving despite their symptoms and visited our ED after reaching their destination. The other 11 drivers pulled their vehicle over shortly after the onset of symptoms and either called an ambulance or drove to a nearby ED.

The frequency of AD occurring while driving may be influenced not only by clinical aspects but also by demographic factors. For example, the incidence may be lower in metropolitan areas where many residents use public transportation and drive less often than suburban residents. We conducted a MEDLINE search and found two preceding studies on AD occurring while driving (Table 1) [4,5]. It is interesting that the frequency of driving-related AD in our cohort was similar to that reported by Kojima et al. (Table 1) [4]. While the frequency in our study was lower than that previously reported by Yoshizaki et al. [5], the frequency of RTA among drivers who sustained an AD was comparable (Table 1). Our finding that the majority of drivers who sustained AD were able to avoid RTAs may also have implication for transportation authorities. However, it remains unclear in our study whether the outcomes of drivers who experience LOC after sustaining AD are truly poor. Thus, multi-center prospective study is warranted to confirm these findings.

Table 1
Summary of reported case series of aortic dissection occurring while driving.

Author	Frequency of AD while driving	Frequency of RTA after AD
Kojima et al. [4]	16/307 (5.2%)	N/A
Yoshizaki et al. [5]	11/666 (1.7%)	2/11 (18.2%)
Our study	20/417 (4.8%)	4/20 (20.0%)

AD, aortic dissection; N/A, not available; RTA, road traffic accident.

Conflict of interest

None.

Funding

The first author (JI) received a medical research grant on traffic accident from the General Insurance Association of Japan.

Acknowledgements

None.

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16 December 2018
https://doi.org/10.1016/j.ajem.2018.12.026

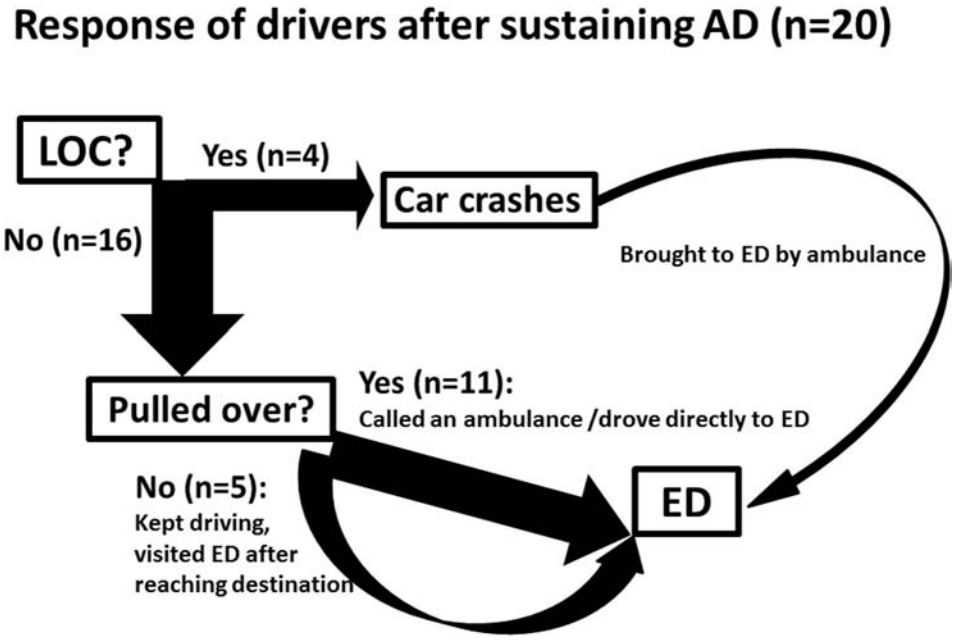

Fig. 1. The response of 20 drivers after sustaining acute dissection (AD) is shown. Four drivers (20%) experienced a loss of consciousness (LOC) and caused a road traffic accident (RTA). The other 16 drivers (80%) did not experience an LOC and were able to avoid RTA: while five drivers kept driving despite their symptoms and visited our emergency department (ED) after reaching their destination, the other 11 drivers pulled their vehicle over shortly after the onset, and either called an ambulance or drove to a nearby ED.

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Use of sedatives and restraints for treatment of agitation in the emergency department

Agitation is a growing and pervasive problem in emergency departments (EDs) across the United States, with an estimated 1.7 million events occurring annually in emergency settings [1,2]. Treatment routinely involves the use of coercive measures consisting of physical restraints and sedatives, but they can lead to significant harm for patients. Cited adverse events have included lasting psychological distress, respiratory depression, physical trauma, and asphyxiation leading to cardiac arrest [3-5]. Efforts to reduce threats to patient safety have recently led to calls for utilization of evidence-based algorithms to help clinicians determine when coercive measures are most appropriate [6].

Despite these recommendations, there remains a lack of standardization for initiation of coercive measures in the ED [7,8]. In part, this variation in practice has been attributed to limited existing knowledge regarding agitation characteristics specific to the emergency setting [9]. Unlike the inpatient or psychiatric units, the ED faces higher acuity of agitation with more varied and complex patient presentations that may lead to aggression and violence [10,11]. Currently, characterization of ED agitation events are mostly derived from health worker surveys in the context of addressing workplace violence [12,13]. In contrast, we sought to examine the use of sedatives and restraints when treating agitation in the ED through prospective observations of patient encounters. This will aid in identifying potential mechanisms requiring additional research and evaluation to better aid clinical decisions for using coercive measures in ED agitation management.

We conducted a prospective cohort study of adult patients aged 18 years or older with acute or escalating agitation during their ED visit. The clinical site was a 944-bed tertiary care academic referral center with an average annual adult ED volume of 100,000 visits. Consecutive patients were enrolled through observations performed during eight-hour blocks by four trained research associates (RAs) encompassing enrollment hours between 11 am to 2:59 am (for all seven days, 80 h per week). Eligibility included any clinical encounter that required a response from protective services personnel. In addition, the research associates regularly walked through the entire clinical unit to identify early cases of escalating patient agitation.

In order to provide a comprehensive description of agitation events, we incorporated a broad spectrum of potential factors and clinical variables to our observation instrument. We compiled our final list (Fig. 1) based on a synthesis of factors identified from our prior literature review

Factor	Method of Data Collection
Patient characteristics (Level 1)	
Demographics: age, gender, race/ethnicity	Chart Review
Triage chief complaint	Chart Review
Report of drug use (per EMS or patient)	Direct Observation
Apparent impairment	Direct Observation
Total number of prior ED visits in the past year	Chart Review
Staff/healthcare team factors (Levels 2 & 3)	
Number of staff involved	Direct Observation
Team leader present	Direct Observation
Any de-escalation attempted	Direct Observation
Reported staff familiarity with patient	Direct Observation
Team Emergency Assessment Measure (TEAM) score [16]	Direct Observation
Environmental/system factors (Levels 4 & 5)	
Treatment step (triage, during treatment, at disposition)	Direct Observation
Hallway occurrence	Direct Observation
Coercion into ED (per EMS or patient)	Direct Observation
Time of agitation event	Direct Observation
Number of patients in ED during agitation event	Direct Observation
Physical Restraint Use	Direct Observation
Chemical Sedative Use	Direct Observation

Fig. 1. Agitation Event Observation Instrument. Each factor and its method of data collection are listed. Categories correspond to levels of the ED agitation framework from Wong et al. [15]. The TEAM score is derived from Cooper et al. [16].