Original Article

Role of Motorcycle-Based Ambulance (Motorlance) in Major Sporting Events

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Background: During sporting events, there are restrictions with regard to access to patients due to closures along normal routes, which can cause delays in patient evaluation. The use of a motorcycle-based ambulance is one possible solution to this problem. However, no studies with regard to this have been conducted in emergency medical services in Thailand.

Objective: To compare the access times of a traditional ambulance and motorlance during major sporting events.

Materials and Methods: This cross-sectional study examined all cases of emergency operations deployed from Srinagarind Hospital (Thailand) during major sporting events from January to November 2019. Data were recorded using the operation national standard checklist for emergency medical services in Thailand, which includes demographic data (age, gender), operation time (day, night), types of patients (trauma, non-trauma), and first on-scene procedure.

Results: During the eleven-month period of the study, there were four major sporting events, in which 23,334 athletes participated and 235 emergency-service operations were carried out. The median times from dispatch to resources being en route (activation time) for the motorlance and ambulance were 1.02 minutes and 1.46 minutes, respectively (p<0.001). The motorlance also had a 2.08-minute lower average response time than the ambulance (defined as call receipt unit arrival on the scene; p<0.001).

Conclusion: The median activation and response times of the motorlance were less than those of the traditional ambulance.

Keywords: Emergency medicine, Emergency medical services, Ambulances, Emergency mobile units

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A traditional ambulance is a vehicle specifically designed to transport critically or injured patients to a hospital. The use of such an ambulance to reach patients in large cities with traffic problems can result in delayed access times[1,2]. At present, there are efforts underway to choose vehicles, such as motorcycles equipped with medical devices (motorlances), that are more highly mobile and that can reduce access times[3]. Advanced emergency medical technicians (AEMTs) are on duty to drive motorlances and are competent to measure oxygen saturation, vital signs checking, and perform airway management and cardiopulmonary resuscitation (CPR)[4].

During sporting events, especially competitions such as marathons, there are restrictions with regard to access to patients due to closures along normal routes, which can cause delays in patient evaluation and/or initial treatment. The use of a motorcycle-based ambulance is one possible solution to this problem. However, there have yet been no studies evaluating the effectiveness of motorlances in Thailand. The objective of the present study was thus to compare the access time to the scene of major sporting events between a traditional ambulance and motorlance.

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Materials and Methods

The present study protocol was approved by the Khon Kaen University Ethics Committee for Human Research (HE621512). The requirement for informed consent from the patients was waived since patient confidentiality protection was guaranteed by identifying individual patients by a unique study number rather than by name.

Study population and design

This cross-sectional study examined all cases in which emergency services were dispatched from Srinagarind Hospital via telephone (1669) during major sporting events from January 1 to November 15, 2019. Cases in which the patients were under 18 years of age or that had missing data were excluded from this study. Data were recorded using the operation national standard checklist for emergency medical services in Thailand, which includes demographic data (age, gender), operation time (day, night), types of patients (trauma, non-trauma), and first on-scene procedure.

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Definitions

Major sporting events were defined as sports-related activities in which more than 1,000 athletes participate. Activation time was defined as time from dispatch to resources being en route, and response time was defined as time from 1669 call receipt to arrival on scene.

Statistical analysis

The sample size was calculated based on the standard deviation of access time detailed in a previous study by Apiratwarakul[3]. In order to achieve a significant level of 5% and power of test of 0.8, we determined that a sample size of 235 would be required. Statistical analysis was performed using SPSS for Windows version 16.0 (SPSS Inc., Chicago, IL, USA). Categorical data were presented as percentage, and continuous data were presented using mean and standard deviation. Univariable analysis was performed using a two-sample t-test for numerical data and a Chi-squared test for comparison of data between the groups.

Results

Over the 11-month period of the study, there were four major sporting events, in which a total of 23,334 athletes participated (Table 1). The event with the highest number of participants (11,601) was the 16th Khon Kaen International Marathon 2019.

Two hundred thirty-five emergency service operations were carried out during the four events listed above (Table 2). The mean age of the patients to whom a motorlances was dispatched was 34.12±7.36 years, and 54.1% (n = 73) were female. Operations were most commonly performed between 0AM and 8AM, both in patients transported by motorlance and those transported by ambulance. Trauma patients accounted for 83.7% and 84.0% of all cases in the motorlance and ambulance group, respectively.

The average times from dispatch to resources being en route (activation time) for motorlance and ambulance were 1.02 minutes and 1.46 minutes, respectively (p<0.001; Table 3). The average motorlance response time was 7.24 minutes and ambulance response time was 9.32 minutes.

Immobilization was the most common first procedure performed on scene. The procedure was performed in 74.2% of cases in the motorlance group compared with 34.5% in the ambulance group (p = 0.014). However, there was no significant difference between the two groups in terms of the proportion of cases in which airway and breathing management were performed (Table 4).

Discussion

Thailand's Emergency Medical Services (EMS) were established to provide prehospital care by medical staff. Emergency medical responders (EMRs), emergency medical technicians (EMTs), advanced emergency medical technicians (AEMTs), paramedics, nurses, and doctor are deployed through this system[5-7]. Dispatchers facilitate communication between the dispatch center and medical personnel[8].

The present study found that the activation time in motorlance group was significantly shorter than in the ambulance group, which is consistent with the results of a previous study[3,9]. This may be due to the fact that the motorlance group deployed only two members of the medical staff (as opposed to the five to six deployed with traditional ambulances), resulting in shorter waiting times prior to deployment.

Table 1. Number of athletes in major sporting events

Major sporting events	Number of athletes
16th Khon Kaen International Marathon 2019	11,601
Freshy Sport Games 2019	6,315
2nd Khon Kaen University Engineers Run 2019	4,320
22nd Srinagarind Minimarathon 2019	1,098

Table 2. Characteristics of the subjects and services

Variable	Motorlance (n = 135)	Ambulance (n = 100)	p-value
Age (years)			
Mean ± SD	34.12±7.36	36.12±8.02	0.724
Gender			
Female	73 (54.1)	60 (60.0)	0.540
Male	62 (45.9)	40 (40.0)	0.602
Operation time			
8AM to 4PM	22 (16.3)	20 (20.0)	0.622
4PM to 0AM	10 (7.4)	22 (22.0)	0.210
0AM to 8AM	103 (76.3)	58 (58.0)	0.420
Type of patients			
Non-trauma	22 (16.3)	16 (16.0)	0.842
Trauma	113 (83.7)	84 (84.0)	0.788

Data are presented as mean±standard deviation (SD) or number (%)

Table 3. Operation time

Time	Motorlance	Ambulance	Difference	95% CI	p-value
Activation time (min)	1.02±0.32	1.46±0.38	0.44	0.24, 1.08	<0.001*
Response time (min)	7.24±1.40	9.32±1.44	2.08	1.20, 2.18	<0.001*

* Statistical significance

Table 4. First procedure performed on scene

Procedures	Motorlance (%)	Ambulance (%)	*p*-value
Airway	8.3	17.6	0.074
Breathing	12.3	21.6	0.068
Circulation	5.2	26.3	0.021*
Immobilization	74.2	34.5	0.014*

* Statistical significance

The motorlances had significantly shorter response times than ambulances in this study, which is consistent with the results of previous studies[3,9]. Response time is a key factor in the successful treatment of emergency patients. During major sporting events, traffic congestion and road closings can negatively affect the arrival time of emergency services to the scene of an emergency[10]. Motorlances can, thus, be used to reduce arrival times and increase the efficiency of Emergency Medical Services[11,12], which must reach patients quickly to assess symptoms and provide treatment. In Thailand, the maximum response time in out-of-hospital cardiac arrest cases is set at eight minutes. The use of a motorlance allowed us to achieve this goal.

The authors also found that most operations were performed during the night shift. This finding differs from those of a previous study[3], which reported in afternoon shift due to the major sporting events usually starting in the early morning. Although many studies[3,4] have found that the most common on-scene management by motorlance involves breathing procedures, in the present study, the most common procedure was immobilization. This is because a common symptom of sports-related injuries is pain in the extremities. Thus the first aids in motorlance group were stabilized and rest in part of pain. Although the present study in many major sporting events, it was limited in that the data were gathered from only one emergency medical services center.

Conclusion

The median activation and response times of the motorlance were less than those of the traditional ambulance.

What is already known on this topic?

A traditional ambulance is a vehicle specifically designed to transport critically or injured patients to a hospital. The use of such an ambulance to reach patients in large cities with traffic problems can result in delayed access times.

What this study adds?

Motorlance can use in major sporting events to reduce activation and response times.

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Potential conflicts of interest

The authors declare no conflicts of interest.

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บทบาทของรถจักรยานยนต์ฉุกเฉินในการแข่งขันกีฬา

กรกฎ อภิรัตน์วรากุล, กมลวรรณ เอี้ยงฮง, ดนุ เกษรศิริ, มธุรส บูรณศักดา, วัชรพงศ์ พุทธิสวัสดิ์, สมศักดิ์ เทียมเก่า

ภูมิหลัง: ในระหว่างการแข่งขันกีฬา การเข้าถึงเพื่อประเมินผู้ป่วยอาจล่าช้าเนื่องจากถนนที่เป็นเส้นทางการแข่งขันถูกปิดหรือการจราจรติดขัด รถจักรยานยนต์ฉุกเฉินจึงถูกนำมาใช้เพื่อแก้ไขปัญหาดังกล่าว อย่างไรก็ตามยังไม่มีการศึกษาในระบบการแพทย์ฉุกเฉินในประเทศไทย

วัตถุประสงค์: เพื่อเปรียบเทียบระยะเวลาการเข้าถึงผู้ป่วยระหว่างรถพยาบาลกับรถจักรยานยนต์ฉุกเฉิน

วัสดุและวิธีการ: การศึกษาแบบตัดขวางที่โรงพยาบาลศรีนครินทร์ มหาวิทยาลัยขอนแก่น ในผู้ที่ใช้บริการการแพทย์ฉุกเฉินระหว่างเดือนมกราคมถึงเดือนพฤศจิกายน พ.ศ. 2562 ในช่วงที่มีการแข่งขันกีฬา ข้อมูลได้จากแบบบันทึกการออกปฏิบัติการในระบบการแพทย์ฉุกเฉินของประเทศไทย ซึ่งมีข้อมูลของผู้ป่วย (อายุ, เพศ) ช่วงเวลาการออกปฏิบัติการ (กลางวัน, กลางคืน) ประเภทของผู้ป่วย (อุบัติเหตุ, ไม่ใช่อุบัติเหตุ) และหัตถการที่ทำที่จุดเกิดเหตุ

ผลการศึกษา: ช่วงเวลาที่ทำการศึกษา 11 เดือน มีการแข่งขันกีฬา 4 รายการ ผู้เข้าร่วมการแข่งขัน 23,334 ราย มีการออกปฏิบัติการการแพทย์ฉุกเฉิน 235 ครั้ง ระยะเวลาจากการสั่งการถึงการออกปฏิบัติการในรถจักรยานยนต์ฉุกเฉินและรถพยาบาลเป็น 1.02 นาทีและ 1.46 นาทีตามลำดับ รถจักรยานยนต์ฉุกเฉินใช้ระยะเวลาตอบสนอง (ระยะเวลาตั้งแต่รับแจ้งเหตุจนถึงที่เกิดเหตุ) น้อยกว่ารถพยาบาล 2.08 นาที

สรุป: ระยะเวลาจากการสั่งการถึงการออกปฏิบัติการและระยะเวลาตอบสนองในรถจักรยานยนต์ฉุกเฉินใช้เวลาน้อยกว่ารถพยาบาล