

Concordance between Emergency Physicians and Cardiologists in Emergency Department

Acil serviste acil tıp ve kardiyoloji hekimleri arasındaki uyumluluk

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Selahattin KIYAN,¹ Ridvan ATILLA,² Nezih BARIŞ,³ Murat ÖZSARAÇ,⁴ Nesibe SÖNMEZ,² Suat KIMAZ,⁵ Bülent ERBİL⁴

¹Department of Emergency Medicine, Ege University Hospital, İzmir; Departments of ²Emergency Medicine, ³Cardiology, Dokuz Eylül University Hospital, İzmir; ⁴Department of Emergency Medicine, Gazi University Hospital, Ankara; ⁵Karşıyaka State Hospital, İzmir.

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SUMMARY

Objectives: The aim of this study was to evaluate the concordance between emergency physicians and cardiologists in the management of patients with cardiovascular complaints and to determine the efficacy of consultations with cardiologist in the emergency department.

Materials and Methods: This analytic research project was conducted in a tertiary university hospital emergency department and cardiology clinic during a one-month period. 240 adult patients with possible or equivalent signs of acute coronary syndromes or any other indication for a cardiology consultation in the emergency department were included. Relationship between emergency physicians and cardiology consultants in initial diagnosis, mean time to make the appropriate initial diagnosis, making an appropriate management plan, mean time to make an appropriate management plan and appropriate final diagnosis were observed.

Results: Seventy of 195 (35.9%) patients received consultations by the cardiologist. The rate of appropriate cardiology consultation decisions were 92.2% (180/195). Emergency physicians ordered four (2.2%) inappropriate positive and 11 (5.6%) inappropriate negative consultations. Of the patients who were consulted, there was not any significant discordance between emergency physicians and cardiology consultants in initial diagnosis, in mean time to make the appropriate initial diagnosis, in making an appropriate management plan; in mean time to make an appropriate management plan, in appropriate final diagnosis ($p=0.125$, $p=0.50$, $p=0.063$, $p=0.063$, respectively). Emergency physicians had a significantly higher error rate in management of cases who did not have consultations ($p=0.023$).

Conclusion: Management of patients with cardiac symptoms by emergency medicine residents is concordant with cardiology consultants in the emergency department.

Key words: Cardiology; consultation; emergency medicine.

ÖZET

Giriş: Bu çalışmanın amacı, acil servise kardiyovasküler şikâyetlerle getirilen hastaların yönetiminde acil tıp ve kardiyoloji asistanlarının uyumunu ve konsültasyonun etkinliğini değerlendirmektir.

Gereç ve Yöntem: Bu ileriye dönük analitik çalışma, üçüncü basamak hastane acil servisi ve kardiyoloji kliniğinin bir ay boyunca yapıldı. Acil servise nontravmatik göğüs/sırt ağrısı, çarpıntı, nefes darlığı, senkop, hipertansiyon yakınmalarıyla başvuran, kardiyak arrest veya ani ölüm ile acil servise getirilen, herhangi bir nedenle kardiyoloji konsültasyonu istenen veya kardiyak takibe alınan 18 yaş üstü 240 hasta, bir ay boyunca çalışmaya alındı. Acil servis hekimleri ile kardiyologlar arasındaki ilişki ön tanı, uygun ön tanıyı yapmak için geçen süre, uygun bir yönetim planı yapma, uygun bir yönetim planı yapmak için geçen süre ve uygun sonuç tanısı açısından değerlendirildi.

Bulgular: 195 hastanın 70'ine (%35,9) kardiyoloji konsültasyonu istendi. Uygun kardiyoloji konsültasyon oranı %92,2 (180/195) saptandı. Acil tıp hekimlerinin 4 (%2,2) hastada uygunsuz pozitif ve 11 (%5,6) hastada uygunsuz negatif konsültasyon istedikleri görüldü. Konsülte edilen hastalarda kardiyoloji hekimleriyle, acil tıp hekimlerinin ön tanı, ön tanı süresi, uygun hasta planı çizibilme, hasta planlama süreleri ve son tanı uygunluğu açısından fark saptanmadı (sırasıyla $p=0,125$, $p=0,50$, $p=0,063$, $p=0,063$, $p=0,063$). Acil tıp hekimleri tarafından konsültasyon istenmeyen hastaların yönetiminde saptanan hata oranı, konsültasyon istenenlere oranla istatistiksel olarak anlamlı olarak yüksek bulundu ($p=0,023$).

Sonuç: Acil servise kardiyak semptomlar ile başvuran hastaların yönetiminde acil servis hekimleri ile kardiyologlar arasında uyum vardır.

Anahtar sözcükler: Kardiyoloji; konsültasyon; acil tıp.

Correspondence (İletişim)

Selahattin KIYAN, M.D.

Department of Emergency Medicine,
Ege University Hospital, 35100 İzmir, Turkey.
Tel: +90 - 232 - 390 23 26
Fax (Faks): +90 - 232 - 388 38 05
e-mail (e-posta): selahattin.kiyan@ege.edu.tr

Introduction

Consultation is an essential component of the clinical practice in emergency departments.^[1] Despite this, little is known about the factors that contribute to the success of a consultation. In the literature, the term “consultant” has been used to refer to any fellow physician the emergency physician would call by telephone or contact regarding any aspect of patient care.^[2] Communication difficulties during consultation process arise because of lack of time, lack of clarity about the reason for consultation, and unclear management plans in the emergency department. Also, emergency physicians and consultants may have different core values and may have little day-to-day contact with each other. Poor communication may lead to disruptions in continuity of care, delayed diagnoses, and unnecessary testing.

Cardiovascular diseases are the major cause of death in adults in Turkey as well as in the world and patients with signs and symptoms of acute coronary syndromes frequently visit emergency departments.^[3] In almost all emergency departments in Turkey, the primary physician to see the patient is usually a general practitioner or an emergency physician but not a cardiologist. The cardiologist usually meets the patient when she/he is called for a consultation after the patient has been evaluated by an emergency physician in the emergency department. Hence, emergency physicians should be competent to evaluate and decide an early, appropriate initial management of patients with suspected acute coronary syndromes in the emergency department. The initial management of acute coronary syndromes should be followed by definitive clinical management by the cardiologist. The success of definitive treatment depends on not only early recognition of acute coronary syndromes in emergency department but also early revascularization of the occluded or narrowed coronary arteries. Delay in initial diagnosis and management may further cause worsened clinical outcome.

The main aim of this study was to evaluate the concordance of emergency medicine physicians and cardiologists in the management of patients with cardiovascular complaints and to determine the efficacy of consultations with cardiologist in the emergency department.

Methods

Study Design

This study was designed as a analytic research project after hospital ethics committee approval in Dokuz Eylül

University Hospital Emergency Department (ED) during one-month period between October 15th, 2002 and November 15th, 2002

Study Population & Setting

The emergency department where the study was conducted had 38.000 patients annually and is staffed with emergency medicine residents and faculty physicians. During the one-month study period, 2551 patients admitted to the ED and 240 patients (9.4%) met the inclusion criteria. Forty of 240 patients with insufficient chart data and five of 240 patients who were lost to follow up were later excluded from the study.

Study Protocol

The inclusion criteria were age over 18 years, possible or equivalent signs of acute coronary syndromes (chest pain, palpitations, shortness of breath, syncope, acute pulmonary edema, hypertension, electrocardiographic changes, arrhythmias, sudden death, etc.) or any other indication for a cardiology consultation in the ED.

The primary physicians in the ED were postgraduate year (PGY) 1, PGY2 and PGY3 emergency medicine residents supervised by senior emergency physicians. Cardiology consultants were PGY 3 cardiology residents supervised by senior cardiologists. Two separate study forms, one for emergency medicine residents (FormEM) and the other for the cardiology consultants (FormCC) were designed. Each form contained the same six sections: (i) initial diagnosis, (ii) initial diagnosis time, (iii) further management plan (laboratory work, medications, etc.), (iv) time of decision for management plan, (v) final diagnosis and (vi) consultation in the ED. The cardiology consultant filled out the FormCC if a consultation had been ordered. Both emergency medicine residents and the consultants were blinded to each others' recordings of the forms.

Patients who were discharged from the emergency department regardless of whether a cardiology consultation had been ordered or not, were followed up one week later in cardiology clinic. A senior emergency physician and a senior cardiologist different from the supervising primary physicians in the emergency department individually evaluated these patients. Patients who were admitted to the hospital were followed up one month later with their chart records for the final diagnosis by these same two physicians.

Measurements & Group Design

Consultation decisions of emergency physicians have been

separated into two groups: first, ordered consultations group (n=70) and second, not ordered consultations (n=125). Then, each these two groups were separated into two subgroups according to appropriateness of the decision. Correct decision of emergency physician to consultate (positive) and not to consultate (negative) the patient were accepted as the “appropriate positive” and “appropriate negative”, respectively. Patients who were consulted (positive) by cardiologist in ED without a clinical or laboratory indication were grouped in “inappropriate positive” consultation decision group and patients who were not consulted (negative) in ED but had had a clinical or laboratory indication for consultation in ED, were grouped as “inappropriate negative” consultation decision group (Figure 1).

A senior emergency physician and a cardiologist used clinical data standarts of American College of Cardiology to determine the appropriateness of interpretations during the follow up evaluation of the patients.¹⁴ Both of them evaluated the interpretations of emergency medicine residents

and cardiology consultant according to guidelines and recorded as appropriate or inappropriate consultation decision for each case. These clinical and laboratory indications have been assigned to clinical symptoms (such as typical chest pain, or any other complaint suggesting acute coronary syndromes) or laboratory findings (such as abnormal ECG changes, elevation of cardiac biomarkers etc.) which might lead to a final diagnosis requires hospital admission in coronary care unit or in cardiology clinic, or to further medical advice of a cardiologist.

Data Analysis

Descriptive tables, McNemar test and chi-square test were used and p<0.05 value was accepted as statistically significant for the results. The Statistical Package for Social Sciences (SPSS) for Windows, version 11.0 was used for the calculations.

Results

Of the 240 patients, forty-five patients were excluded from the study. 106 of 195 (54.4%) patients were female.

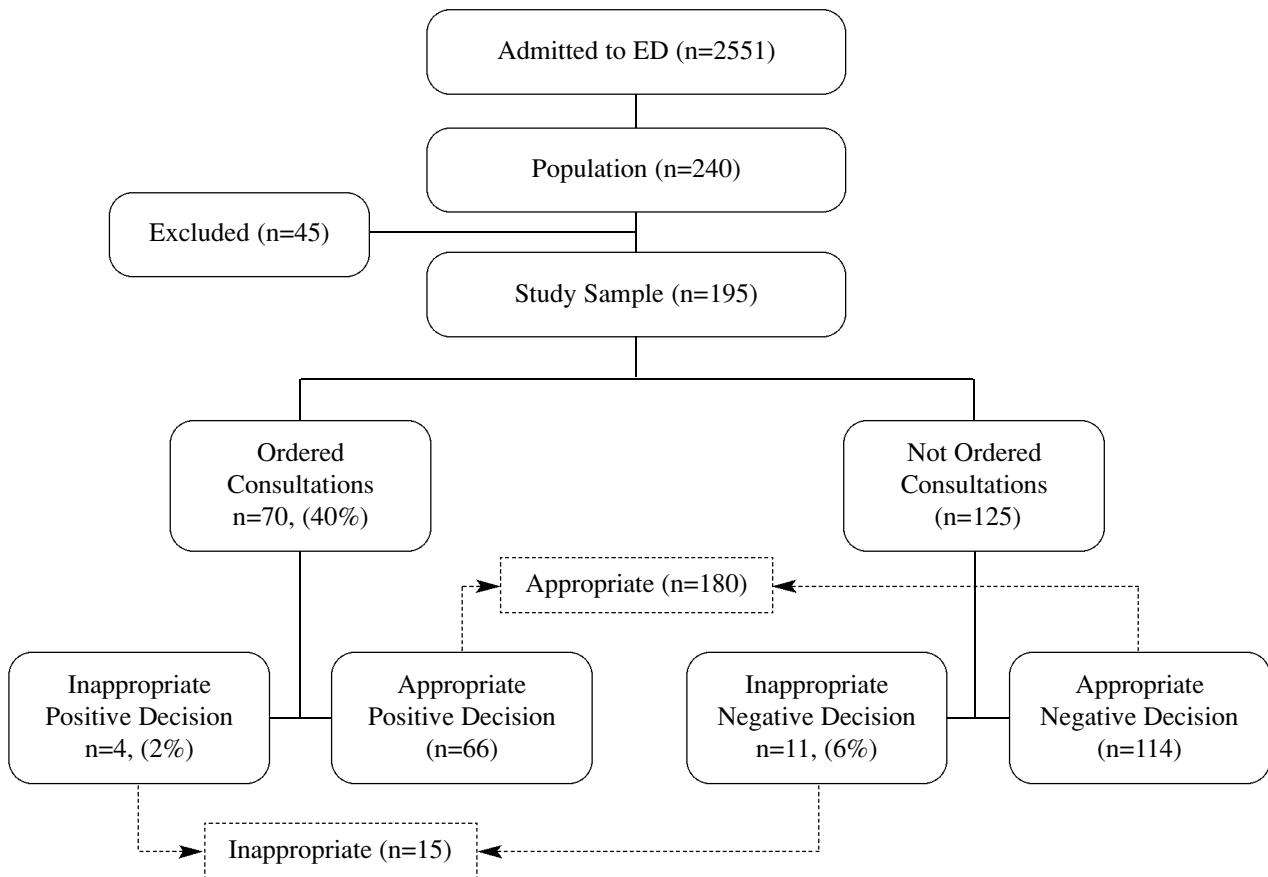


Fig. 1. Patient selection and grouping of the study sample.

Average age of the study group was 62±15 years with a range of 23 to 92 years.

The most common presenting complaint of the patients was chest pain (37.9%) followed by shortness of breath, palpitations and elevated blood pressure (24.6%, 12.3% and 6.7% respectively).

1. Initial diagnosis

There was not any significant discordance between emergency physicians and cardiology consultants in the initial diagnosis; emergency physicians made the appropriate initial diagnosis in 186 of 195 (95.4%) patients and the cardiology consultant made the appropriate initial diagnosis in 65 of 70 (92.8%) patients ($p=0.125$).

2. Time of initial diagnosis

There was not any significant discordance between emergency physicians and cardiology consultants in the mean time to make the appropriate initial diagnosis; emergency physicians made an appropriate initial diagnosis in 186 of 195 (95.4%) patients and the cardiology consultant made an appropriate initial diagnosis in 67 of 70 (96.6%) patients in less than 30 minutes ($p=0.50$). The initial diagnosis time was appropriate in 190 patients (97.4%) for the emergency residents and 68 patients (97.1%) for the cardiology consultants.

3. Management plan

There was not any significant discordance between emergency physicians and cardiology consultants in making an appropriate management plan; emergency physicians made an appropriate management plan in 178 of 195 (91.2%) patients and the cardiology consultants made appropriate management plan in 64 of 70 (91.4%) patients ($p=0.063$).

4. Time of management plan

There was not any significant discordance between emergency physicians and cardiology consultants in the mean time to make an appropriate management plan; emergency physicians made appropriate management plan in 184 of 195 (93.8%) patients and cardiology consultants made appropriate management plan in 63 of 70 (89.9%) patients in less than 30 minutes ($p=0.063$).

5. Final diagnosis

Of the 195 patients, the most common final diagnosis were nonspecific chest pain in 38 (19.4%) patients and acute coronary syndromes in 34 patients (17.4%) (Table 1). There was not any significant discordance between emergency

Table 1. The final diagnosis of the patients.

Diseases	Total Number (Percent)
Nonspecific chest pain	38 (19.4%)
Acute Coronary Syndromes	34 (17.4%)
Dysrhythmia	25 (12.8%)
Pulmonary diseases	24 (12.3%)
Congestive heart failure	17 (8.7%)
Hypertension	15 (7.2%)
Syncope	9 (4.6%)
Total	195

physicians and cardiology consultants in the appropriate final diagnosis; emergency physicians made the appropriate final diagnosis in 183 of 195 (93.8%) patients and cardiology consultants made an appropriate final diagnosis in 65 of 70 (92.8%) patients ($p=0.063$). Emergency physicians made five (2.5%) major final misdiagnoses and seven minor final misdiagnosis (Table 2). The cardiology consultant made four (5.7%) major final misdiagnoses and one minor final misdiagnosis (Table 3). However, emergency physicians had made the correct final diagnosis in 4 of 5 patients misdiagnosed by the cardiology consultant. Two patients had been misdischarged based on the decision of the cardiology consultant while three patients were admitted to hospital despite that they had been misdiagnosed in the emergency department.

6. Consultation

Seventy two consultations with a cardiologist were ordered, but two patients left the emergency department

Table 2. Final misdiagnosis by emergency physicians and comparison with correct diagnosis.

Patient	Final misdiagnosis by emergency physicians in ED	Correct final diagnosis
1	Low-risk unstable AP	Nonspecific chest pain
2	Stable AP	Low-risk unstable AP
3	Myalgia	Nonspecific chest pain
4	COPD exacerbation	NSTEMI*
5	Stable AP	Nonspecific chest pain
6	Panic disorder	Nonspecific chest pain
7	Vasovagal syncope	Cardiac syncope*
8	Panic disorder	Nonspecific chest pain
9	Hypertensive urgency	Hypertensive emergency*
10	Hypertensive urgency	Unstable AP*
11	Nonspecific palpitation	COPD exacerbation
12	Nonspecific palpitation	Unstable AP*

* Major final misdiagnosis by emergency physician; NSTEMI: Non-ST elevation myocardial infarction; COPD: Chronic obstructive pulmonary disease; AP: Angina pectoris.

Table 3. Final misdiagnosis by cardiology consultant and comparison with correct diagnosis.

Patient	Final misdiagnosis by cardiology consultant in ED	Correct final diagnosis
1	Low-risk unstable AP	NSTEMI*
2	Stable AP	Unstable AP*
3	Hypertensive urgency	High-risk unstable AP*
4	Stable AP	Aortic stenosis
5	Nonspecific chest pain	Unstable AP*

* Major final misdiagnosis by cardiology consultant; NSTEMI; Non-ST elevation myocardial infarction; AP: Angina pectoris.

against medical advice after the consultation decision. So that a total of seventy of 195 (35.9%) patients received consultations by the cardiologists. Emergency physicians ordered appropriate consultation decisions in 180 patients (92.2%). Of 15 patients for whom inappropriate consultation decisions were made, four (2.2%) inappropriate positive consultations and 11 (5.6%) inappropriate negative consultations were ordered (Fig. 1).

Emergency physicians had a significantly higher error rate in management of cases who did not have consultations than in cases who did have consultations (p=0.023). There were not any significant differences between these two groups in initial diagnosis, time of initial diagnosis and final diagnosis (p=0.479, p=0.208, p=0.092, respectively). Hospital admission was the most common outcome for the 43 of 70 (61.4%) cases who had consultations. Appropriateness of consultation decisions according to the final diagnosis is shown at Table 4.

There is no significant difference between the decisions of PGY1, PGY2 and PGY3 emergency medicine residents

(p=0.124, p=1.00, p=0.123, p=0.272, respectively). There were also no significant difference between ED and cardiology residents according to the in initial diagnosis, time of initial diagnosis, management plan and final diagnosis (p=1.00, p=1.00, p=1.00, respectively).

Discussion

Emergency physicians should collaborate with cardiologists to provide the best care for the patients with suspected acute coronary syndromes in the emergency department. The principles of collaboration between emergency medicine and cardiology primarily depend on appropriate initial diagnosis, appropriate initial management and an appropriate consultation process.^[5-7]

The overall consultation rate of this study was similar according to another study in the literature.^[8]

The appropriate cardiology consultation rate was significantly high in our study. Four inappropriate positive consultation decisions by emergency residents were later diagnosed as nonspecific chest pain, low-risk unstable angina pectoris and two cases of compensated congestive heart failure. The main reason for the inappropriate positive consultation decisions was inappropriate criterisation of the clinical guidelines. There were 11 inappropriate negative decisions in which the main reason for the inappropriate negative consultation decision were inappropriate initial diagnoses, but not discordance with the guidelines.

Requesting an admission to the hospital or specific medical advice are the most common reasons for consultation in emergency departments.^[2] Approximately two thirds (61.4%) of all the patients who had consultations were

Table 4. Appropriateness of consultation decisions according to the final diagnosis.

Final diagnosis	Consultation decision					
	Appropriate		Inappropriate		Total	
	n	%	n	%	n	%
Acute coronary syndromes	33	17	1	0.5	34	17.5
Heart failure	15	7.7	2	1.0	17	8.7
Nonspecific chest pain	36	18.5	2	1.0	38	19.5
Disrhythmia	23	11.8	2	1.0	25	12.8
Syncope	7	3.6	2	1.0	9	4.6
Hypertension	13	6.7	2	1.0	15	7.7
Pulmoner diseases	23	11.8	1	0.5	24	12.3
Stable angina pectoris	7	3.6	1	0.5	8	4.0
Other	23	11.8	2	1.0	25	12.8
Total	180	92.3	15	7.7	195	100

admitted to the hospital in our study. The patients with an appropriate consultation decision had significantly better management rates than the patients who did not have consultations. We suggest emergency medicine training programs should emphasize the importance of appropriate consultation decisions in their core content.

We want to emphasize that in certain circumstances where the diagnosis of the patient is uncertain, consultants have a chance to “cover” their misdiagnosis when they use their authority to admit the patient to their inpatient service. However, emergency physicians in Turkey’s hospitals, regardless of whether they are residency trained or not, do not have the authority to admit patients to the hospital without the confirmation of the consultant. Emergency physicians should think twice and evaluate all the potential risks before a discharge decision which may eventually cause serious time management problems in a busy emergency department.

In this study, emergency medicine residents were concordant with cardiologists on management of patients in the initial diagnosis, time to initial diagnosis, initial management plan, time to initial management plan, and final diagnosis.

As the most common final diagnosis was acute coronary syndrome among admitted patients in our study, the time of initial management becomes an important indicator of consultation efficacy. All the patients who were diagnosed as ST-elevated myocardial infarction had been evaluated and received consultations in less than 15 minutes. All of the patients with acute coronary syndromes who had a correct initial diagnosis and initial management plan underwent revascularization treatment according to international guidelines. Three patients went to the catheterization lab between 15 and 30 minutes and two patients were given thrombolytic agents between 30 and 60 minutes. These time-to-vein and time-to-needle results were concordant with ACC/AHA guidelines.^[9] Early and appropriate cardiac consultation with a cardiologist plays a vital step in the management of the acute coronary syndromes in the emergency department. Inappropriate consultations decrease the quality of service in emergency departments and may also interrupt the “busy” consultants with unnecessary calls. Overall, an immediate cardiology consultation was advised for cases in which the initial diagnosis and treatment plan is unclear to the emergency physician or is not covered directly by the agreed-on protocol.^[9]

Emergency medicine residents had five cases of major misdiagnoses in this study. Three (1.5%) patients with acute coronary syndromes were misdiagnosed and discharged but none of these patients had undergone revascularisation treatment or died later.

The major final misdiagnosis by cardiology consultant are mainly cause of misinterpretation of the risk criteria of the four patients with unstable angina pectoris.

Overall, all the major misdiagnosis were made in patients with atypical complaints in our study. In the literature, it has been suggested that patients with atypical complaints (presyncope/syncope, shortness of breath, nausea/vomiting palpitations, etc) have a higher mortality rate for acute coronary syndromes.^[10] Emergency physicians should not prejudge patients with atypical complaints to rule out acute coronary syndromes but should follow the international guidelines.^[2,9,11]

Limitations

There are some limitations of this study. First, we evaluated just the final diagnoses of the patients so we could not make any further analysis of efficacy of diagnostic tool usage for acute coronary syndromes. We did not evaluate the concordance of interpretation of the ECG, chest X-ray, and biochemical cardiac markers between the emergency medicine residents and the cardiologists. Although high discordance rate of ECG interpretations between emergency physicians and cardiologists has been reported in a previous study, none of these patients’ outcome was affected.^[12]

Also, although concordance between emergency residents’ and cardiologists’ management plans was evaluated by a senior emergency physician and cardiologist according to international guidelines, we did not evaluate both of these physicians’ reliability against any other benchmark.

Conclusion

This study revealed that management of patients with cardiac symptoms by emergency medicine residents is concordant with the management by cardiology consultants in our ED. In the light of international guidelines, cardiology consultation decisions made by emergency residents are appropriate and effective in the ED. The conflicts encountered can only be resolved by appeal to a higher goal: the good of the patient. Team work, respect for each other’s protocols, and close communication should be the priorities between

the emergency medicine and other disciplines as well as cardiology in order to maintain optimal patient care in the ED.

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