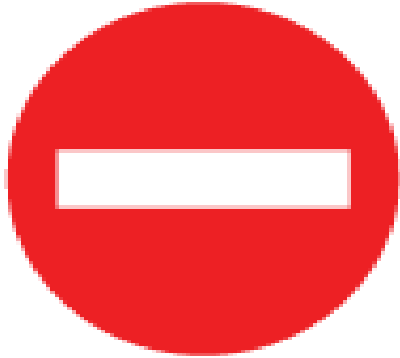


ACİL SERVİS & YOĞUN BAKIM



PROF. DR. BAŞAR CANDER

YOĞUN BAKIM ÜNİTESİ



Girilmez
NO ENTRY

Before I start...



I'm not an intensive care doctor.....

.....but I do have some critical care skills

.....and more importantly I regularly see patients who are critically ill

As such what practical things could I learn from the critical care stream at the conference?



- Kritik hastaların acil serviste tedavisi ve yönetimi giderek gelişen bir süreç
- Acil servisler kritik hasta yönetiminde merkezi bir rol oynamaktadır



- Kritik bakım hastaları giderek artmakta
- Bu hastalar acil servislerde daha uzun süre kalmakta
- Çeşitli nedenler:
 - Sayının artması
 - Yatakların yetmemesi
 - Laboratuvarın gecikmesi
 - Tanı zorlukları
 - Çalışmalar bu gecikmelerde acil servis çalışanlarının rolü olmadığını göstermiş

Kritik hasta



“Fizyolojik olarak stabil olmayan, kliniğinin yakın olarak takip edilmesi ve tedavisinin dakika dakika yönlendirilmesi gereken hasta grubudur”.





- Kritik hasta klasik olarak yoğun bakım ünitelerinde tedavi edilir

ANCAK

Bu hastaların büyük bir kısmı ilk Acil servislere başvurur ve tedavilerine ilk Acil servislerde başlanır.

KRİTİK HASTA



- Fizyolojik olarak stabil olmayan,
 - Kliniğinin yakın olarak takip edilmesi ve
 - Tedavisinin dakika dakika yönlendirilmesi gereken hasta grubudur”
-
- Kritik hasta klasik olarak yoğun bakım ünitelerinde tedavi edilir.
 - Bu hastaların büyük bir kısmı ilk Acil servislere başvurur ve tedavilerine ilk Acil servislerde başlanır.

Recognition of critically ill



- Airway
 - Signs / risk of airway obstruction
- Respiratory
 - RR < 8 or > 30, SpO₂ < 93%
 - HR < 40 or > 100
- CVS
 - SBP < 100 or fall > 40 from baseline
- Renal
 - Urine output < 100 ml / 4 hours
- CNS
 - Agitation, confusion or decrease in GCS



- ABD’de Acil servis başvuru oranı yıllık **100 milyonun** üstündedir.
- Bu başvuruların Bu başvuruların **%40** hastaneye yatar.
- Hastaneye yatan hastaların **%25**’i ise kritik hastadır.



- Hastane içindeki yatak sayısının sınırlı olması nedeni ile kritik hastalar acil servislerde kalmakta ve hastalar yoğun bakımlara ABD’de ortalama 145-367 dakika arasında;
- Avusturalya’da ortalama 1.1 günlük bir süreçte çekilebilmektedir.

Acil Yoğun Bakım Neden?



- Acil servis aşırı kalabalığında hastalar koridorlarda ve gözden uzak yerlerde kalabilir.
- Hemşire ve doktor gözetiminden uzaktaki bu hastalar geç tanı ve tedavi nedeniyle kötü prognoza sahip olabilirler.
- Servislerdeki kalabalık nedeniyle hastalar yatamamakta, hastalar acilde optimal tedavi almamaktadır.
- Ya da durumları biraz toparladıktan sonra tam tedavi olmadan erken taburcu olabilmektedirler.
- İçerinin kalabalığı nedeniyle acil servise giremeyen ve beklemekten sıkılan hastaların bir kısmı daha sonra daha kötü durumda çok acil olarak başvurabilmektedirler.

Acil Yoğun Bakım Neden?



- Yakın monitörizasyon
- İleri teknoloji
- Kolay ulaşılabilen konsültanlar
- Düşük hemşire/hasta oranı gibi sebeplerle kritik hastalara optimal tedavi sağlanabilmektedir

Acil Yoğun Bakım Neden?



- Hastane öncesi,
- Acil servis
- Yoğun bakım süreçleri;

- Kesintisiz olmalı,
- Birbirinden bağımsız olmamalı,
- Birbirini tamamlar olmalıdır.



- Travma hastasındaki “**altın saat**” gibi, kritik hastada da tanının en kısa sürede doğrulanıp, hızlıca tedavinin acil serviste başlanması mortalite, morbidite ve kaynak kullanımını azaltmaktadır.
- Yoğun acil servislerde bu her zaman mümkün olamamaktadır.

Buist MD, et al. BMJ 2002; 324: 387-390.
Sacchetti A, et al. Am J Emerg Med 1999; 17: 571-574



- Acil servis kalabalığının hastanın tanı, tedavisinde gecikmeye ve dolayısıyla prognozunda kötüleşmeye neden olduğunu gösteren gözlemsel çalışmalar vardır.
- Özellikle bu kalabalığın zamanında teşhisin ve tedavinin önemli olduğu **AKUT KORONER SENDROM, İNME, CERRAHİ ACİLLER** ve **SEPTİK ŞOK** gibi kritik durumlarda daha da önemli olduğu çok iyi bilinmektedir.



- Acil servisteki prognozu nasıl hastane öncesi bakım ve müdahaleler belirliyor ise; yoğun bakıma yatan hastanın prognozunu da acil serviste aldığı tedavinin kalitesi belirler.
- **Safar'**ın belirttiği gibi hastane öncesi, acil servis ve yoğun bakım süreçleri;
 - Kesintisiz olmalı,
 - Birbirinden bağımsız olmamalı,
 - Birbirini tamamlar olmalıdır.

Acil Servis ve Yoğun Bakım Literatür



- Literatürde kritik hastada Acil servis yoğun bakım ünitesi arasındaki sürenin prognoza etkisi üzerine çelişkili sonuçlar vardır.
 - Bir kısım çalışmalar sürenin sonucu (mortalite) etkilemediğini bulmuştur.
 - Bir takım çalışmalar ise sürecin prognozu etkilediğini göstermiştir.

- 
- Acil servisten yoğun bakıma 24 saatten kısa sürede kabul edilenler ile, 24 saatten daha uzun süre de kabul edilenler arasında yoğun bakımda kalış süresi ve mortalite açısından fark olmadığı bulunmuş.

Am J Emerg Med. 2005 May;23(3):336-9.

Outcomes of critically ill patients.

Tilluckdharry L, Tickoo S, Amoateng-Adjepong Y, Manthous CA.

Pulmonary and Critical Care, Bridgeport Hospital, CT 06616, USA.

Abstract

OBJECTIVE: We hypothesized that critically ill patients who remain in the ED for more than 24 hours experience worse outcomes and longer lengths of stay than those transferred to the medical intensive care unit (MICU) within 24 hours.

METHODS: Medical records were examined of all patients admitted to the MICU directly from the ED of a 325-bed community teaching hospital between 2001 and 2002.

RESULTS: Of 443 patients, 104 remained in the ED for 24 hours or longer ($ED \geq 24$) before being transferred to the MICU. There were no significant differences in demographic characteristics of the 339 who were in the ED for less than 24 hours ($ED < 24$) as compared with $ED \geq 24$. APACHE II scores were 18.9 ± 1.0 for a random sample of $ED < 24$ and 20.5 ± 0.9 for $ED \geq 24$ ($P = .2$). Lengths of hospital stay were 10.9 ± 0.8 days for $ED < 24$ and 9.8 ± 0.9 days for $ED \geq 24$ ($P = .7$). Mortality rates were 26.8% for $ED < 24$ and 26.9% for $ED \geq 24$ ($P = .5$).

CONCLUSIONS: These data suggest that outcomes of critically ill patients transferred from the ED to our MICU within 24 hours were not better than those who remained in the ED for longer durations. Larger studies are required to examine this hypothesis.

- 
- İlk 24 saat içinde yoğun bakıma yatırılan hastaların mortalitesi daha geç yatırılanlara göre düşüktür.

Crit Care Med. 1990 Nov;18(11):1231-5.

Timing of intensive care unit admission in relation to ICU outcome.

Rapoport J, Teres D, Lemeshow S, Harris D.

Department of Economics, Mount Holyoke College, South Hadley, MA 01075.

Abstract

This study assessed the relationship between admission time (from hospital admission to ICU admission) and mortality predicted by the Mortality Prediction Model (MPM), actual mortality, and resource use. All admissions, except elective surgery patients, to the general medical/surgical ICU of a tertiary care hospital during a 24-month period were studied (n = 1,889). Patients admitted to the ICU within 1 day of hospital admission had lower predicted and actual mortality, and used fewer resources than patients admitted later. Predicted mortality was higher than actual mortality for patients admitted to the ICU early and was lower than actual mortality for later ICU admissions. Transfers had higher predicted and actual mortality, and used more resources than nontransfer patients. Time from hospital admission to ICU admission can be a potentially useful variable in models of ICU outcome.

- **Critical care of medical and surgical patients in the ED: length of stay and initiation of intensive care procedures.** Am J Emerg Med 1997 Nov;15(7):654-7.
- **Svenson J, Besinger B, Stapczynski JS.**
- **Department of Emergency Medicine, University of Kentucky, Lexington, USA.**
- Little is known about the extent of critical care delivered to patients in the emergency department (ED) and its impact on ED lengths of stay or patient outcomes. The purpose of this study was to characterize the timing of care for critically ill patients, both medical and surgical, in the ED. The design was a retrospective review. The setting was a university teaching hospital. The subjects were ED patients subsequently admitted to a medical or surgical intensive care unit (ICU). The average length of stay in the ED was 367 minutes. Thirty percent of patients were boarded in the ED because of lack of beds in the ICU. Stabilization procedures were performed on 45 (27%) patients, on average 102 minutes after ED admission. Monitoring procedures were performed on 35 (21%), on average 170 minutes after ED admission. There were no significant differences in length of stay, use, and timing of critical procedures in medical and surgical patients. Critically ill patients represent a significant portion of ED patients and may remain in the ED for prolonged periods of time. One of the major contributors to these prolonged stays are lack of beds. Both resuscitative and monitoring procedures are often performed in the ED setting for all types of critical patients. The timing of these procedures indicates that they are performed when necessary for patient care regardless of ED or ICU setting. Thus, ICU care is often initiated and maintained in the ED setting. EDs must be staffed adequately with appropriately trained personnel to care for these patients.

Acil serviste gerektiği zaman gerektiği müdahaleler yoğun bakıma yatışı beklemeden yapılmalıdır. Kritik hasta bakımı için yeterli, eğitimli eleman ve ekipman acil servislere sağlanmalıdır.

Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit*

Donald B. Chaffin, MD, MS, FCCM; Stephen Trzeciak, MD, MPH; Antonios Likourezos, MA, MPH; Brigitte M. Baumann, MD, MSCE; R. Phillip Dellinger, MD, FCCM; for the DELAY-ED study group

- Acil servise başvuran kritik hasta sayısı artınca
- Hastane ve acil servis kalabalık olunca
- Yoğun bakım yatakları dolu olunca hastaların yoğun bakım yatağını acil serviste bekleme süreleri artıyor.

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- Çalışmada ≥ 6 saat ve <6 saat altında acil serviste kalarak yoğun bakım yatağı bekleyen hastaların yoğun bakım yatış süresi, yoğun bakım ve hastane mortaliteleri arasında fark var mıdır? sorusuna cevap aranmıştır.

Kritik hasta yönetimi



Box 1. Potential high risk areas

Triage

Patient evaluation

Drug administration

Procedures

Stabilization

Resuscitation

Transfers

Triaj



- Kritik hastada çok önemli
- Uygun alan nakli(resusitason ve stabilizasyon)

Hasta Değerlendirme



- Hikaye:net olmayabilir.Alınmayabilir
- Güvenlik çemberi
- ABC

Tedavi



- Agresiv ve zamanla yarışan özellikte
- Vazopressör
- Vazodilatör
- Sedatif
- Antikoagulan
- Trombolitik
- Antibiyotik
- Paralitik



- Medikal tedavi hatalarından kaçınmak gerekiyor
 - Dozlar uygun seçilmeli
 - İlaçlar uygun seçilmeli
 - Doğru zamanda yapılmalı
- Kritik hastalarda medikal ilaç uygulamalarında hata oranı yüksek olabiliyor
- Yapılan ilaçlar mutlaka kayıt edilmeli
- Yeni başlayan hemşirelere dikkat

Girişimler



- **Stabilizasyon prosedürleri**
 - Entübasyon
 - Santral venöz kateterizasyon
 - Göğüs tüpü yerleştirilmesi
 - Kardiyoversiyon
 - Pacemaker yerleştirme
- **Monitörizasyon prosedürleri**
 - Arterial kateterizasyon,
 - Monitörize etmek için santral venöz kateterizasyon
 - İntraserebral basınç monitörizasyon



Procedures performed on critically ill patients in the ED and the ICU

Procedure	Adult		Pediatric (<17 years)		Total	
	ED	ICU	ED	ICU	ED	ICU
Telemetry	254	97	86	89	340	186
A-Line	1	12	0	2	1	14
Central line	10	11	0	1	10	12
Intubation	34	27	5	6	39	32
ACLS/PALS protocols	16	2	1	1	17	3
Thoracostomy tube	1	1	0	0	1	1
Tracheostomy	0	1	0	0	0	1

Abbreviations: A-line, arterial line; ACLS, advanced cardiac life support; PALS, pediatric advanced life support.

Data from Nelson M, Waldrop RD, Jones J, et al. Critical care provided in an urban emergency department. Am J Emerg Med 1998;16:56–9.



- Öğrenciler acil girişimlerin çokluğundan dolayı acil tıbbi tercih ediyorlar
- Yapılan çalışmalarda acil serviste kalış süresini uzatan yapılan girişimler değil yatak olmamasıdır
- Girişimler resusitatif veya monitörizasyon amaçlı
- Girişimler ihtiyaç anında yapılmalı acil de veya yoğun bakımda



- Girişimlerde ultrasound giderek önem kazanıyor
- Komplikasyonlar azalıyor

Hava yolu yönetimi



- Kritik hasta bakımında en önemli noktalardandır
- Sakles ve arkadaşları
 - Medikal tanılar
 - KKY
 - KOAH
 - Sepsis
 - Mental durum değişikliği
 - Travma (%47)
- Tümü acil asistan ve uzman %100 başarı

Tranfer



- Son aşama Transfer aşaması



- Acil serviste başlanan ağır sepsis ve septik şoktaki **erken hedefe yönelik tedavi** sadece mortaliteyi değil; mekanik ventilasyon ve pulmoner arter kateter takılması ihtiyacını da azaltmaktadır.
- Aynı şekilde akut solunum yetmezliğinde acil serviste başlanan **NIMV** hem prognozu iyileştirmekte (entübasyon ve yoğun bakıma yatış oranını azaltmakta) hem de YBÜ'de kalış süresini ve maliyeti azaltmaktadır.



- Acil servislerde optimal tedavi alan hastalarda YBÜ'ndeki yatış süresi azalır; erken hedefe yönelik tedavi ve NIMV uygulanması yoğun bakımdaki yatış süresini ve maliyeti azaltır.





- Acil servisler yılda 100 milyondan fazla hastanın tedavi edildiği servislerdir. Hastaneye başvuran hastaların %2.9'unu sepsis ve septik şoklu hastalar oluşturmaktadır. Yani yılda 387 616 sepsisli hasta acil servislere başvurmaktadır. Bu rakam ABD'de yılda görülen sepsis, septik şoklu hastaların %50'sini oluşturmaktadır.



- Rivers ve arkadaşlarının gösterdiği gibi septik şoklu hastaya erken hedefe yönelik tedavinin daha acil serviste iken başlanması morbidite ve mortaliteyi azaltmaktadır. Bu nedenle acil servislerde **sepsis** ve **septik şoklu** hastanın **erken tanısı, erken tedavisi** önem kazanmaktadır.

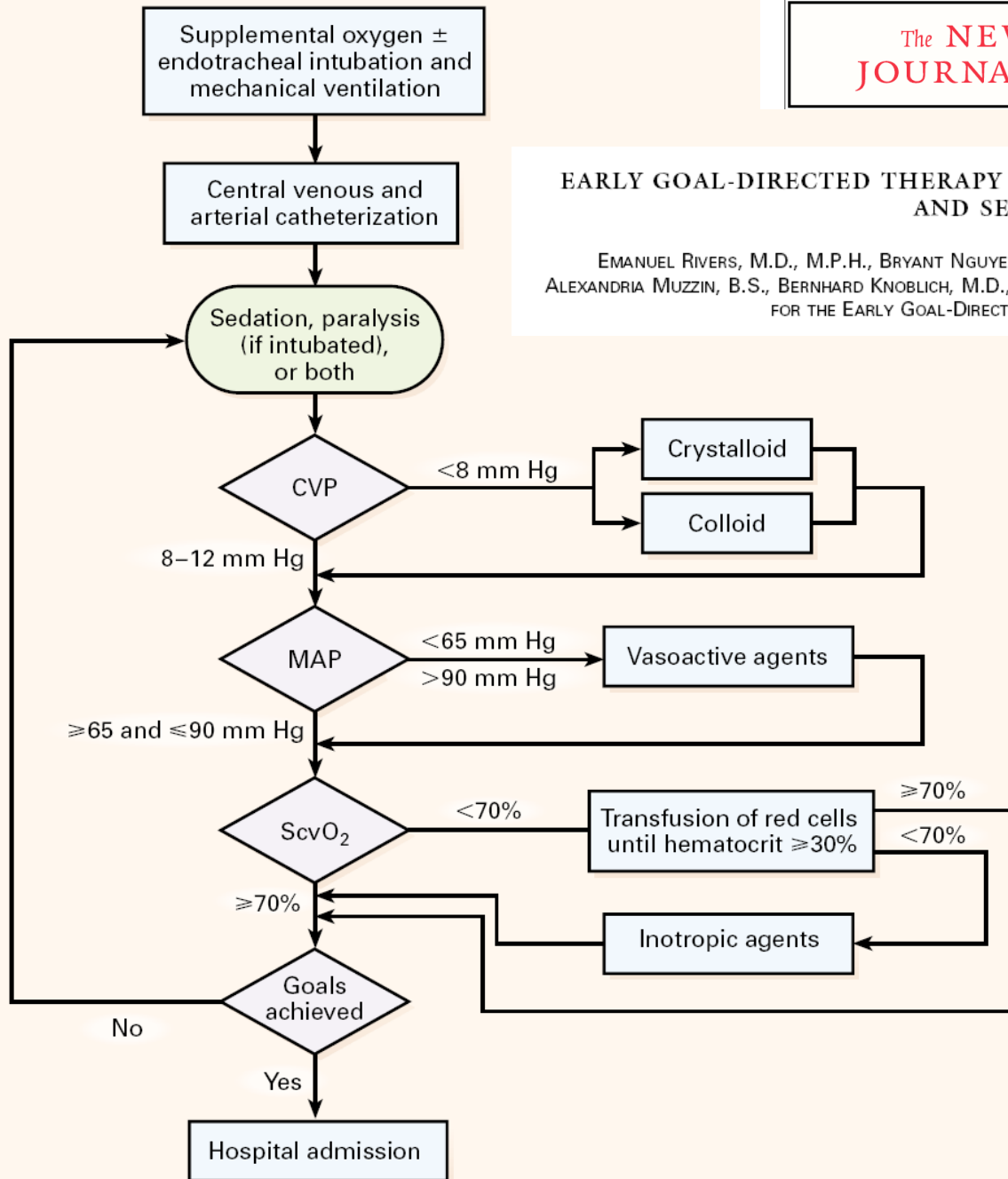
- **Early goal-directed therapy in the treatment of severe sepsis and septic shock. N Engl J Med 2001 Nov 8;345(19):1368-77.**

- **Rivers E, Nguyen B, Havstad S, Ressler J, Muzzin A, Knoblich B, Peterson E, Tomlanovich M;
Early Goal-Directed Therapy Collaborative Group.**

- Department of Emergency Medicine, Henry Ford Health Systems, Case Western Reserve University, Detroit, MI 48202, USA.
erivers1@hfhs.org
- **BACKGROUND:** Goal-directed therapy has been used for severe sepsis and septic shock in the intensive care unit. This approach involves adjustments of cardiac preload, afterload, and contractility to balance oxygen delivery with oxygen demand. The purpose of this study was to evaluate the efficacy of early goal-directed therapy before admission to the intensive care unit. **METHODS:** We randomly assigned patients who arrived at an urban emergency department with severe sepsis or septic shock to receive either six hours of early goal-directed therapy or standard therapy (as a control) before admission to the intensive care unit. Clinicians who subsequently assumed the care of the patients were blinded to the treatment assignment. In-hospital mortality (the primary efficacy outcome), end points with respect to resuscitation, and Acute Physiology and Chronic Health Evaluation (APACHE II) scores were obtained serially for 72 hours and compared between the study groups. **RESULTS:** Of the 263 enrolled patients, 130 were randomly assigned to early goal-directed therapy and 133 to standard therapy; there were no significant differences between the groups with respect to base-line characteristics. In-hospital mortality was 30.5 percent in the group assigned to early goal-directed therapy, as compared with 46.5 percent in the group assigned to standard therapy ($P = 0.009$). During the interval from 7 to 72 hours, the patients assigned to early goal-directed therapy had a significantly higher mean ($\pm$ SD) central venous oxygen saturation (70.4 ± 10.7 percent vs. 65.3 ± 11.4 percent), a lower lactate concentration (3.0 ± 4.4 vs. 3.9 ± 4.4 mmol per liter), a lower base deficit (2.0 ± 6.6 vs. 5.1 ± 6.7 mmol per liter), and a higher pH (7.40 ± 0.12 vs. 7.36 ± 0.12) than the patients assigned to standard therapy ($P < 0.02$ for all comparisons). During the same period, mean APACHE II scores were significantly lower, indicating less severe organ dysfunction, in the patients assigned to early goal-directed therapy than in those assigned to standard therapy (13.0 ± 6.3 vs. 15.9 ± 6.4 , $P < 0.001$). **CONCLUSIONS:** Early goal-directed therapy provides significant benefits with respect to outcome in patients with severe sepsis and septic shock.
- PMID: 11794169 [PubMed - indexed for MEDLINE]

EARLY GOAL-DIRECTED THERAPY IN THE TREATMENT OF SEVERE SEPSIS AND SEPTIC SHOCK

EMANUEL RIVERS, M.D., M.P.H., BRYANT NGUYEN, M.D., SUZANNE HAVSTAD, M.A., JULIE RESSLER, B.S.,
ALEXANDRIA MUZZIN, B.S., BERNHARD KNOBLICH, M.D., EDWARD PETERSON, PH.D., AND MICHAEL TOMLANOVICH, M.D.,
FOR THE EARLY GOAL-DIRECTED THERAPY COLLABORATIVE GROUP*

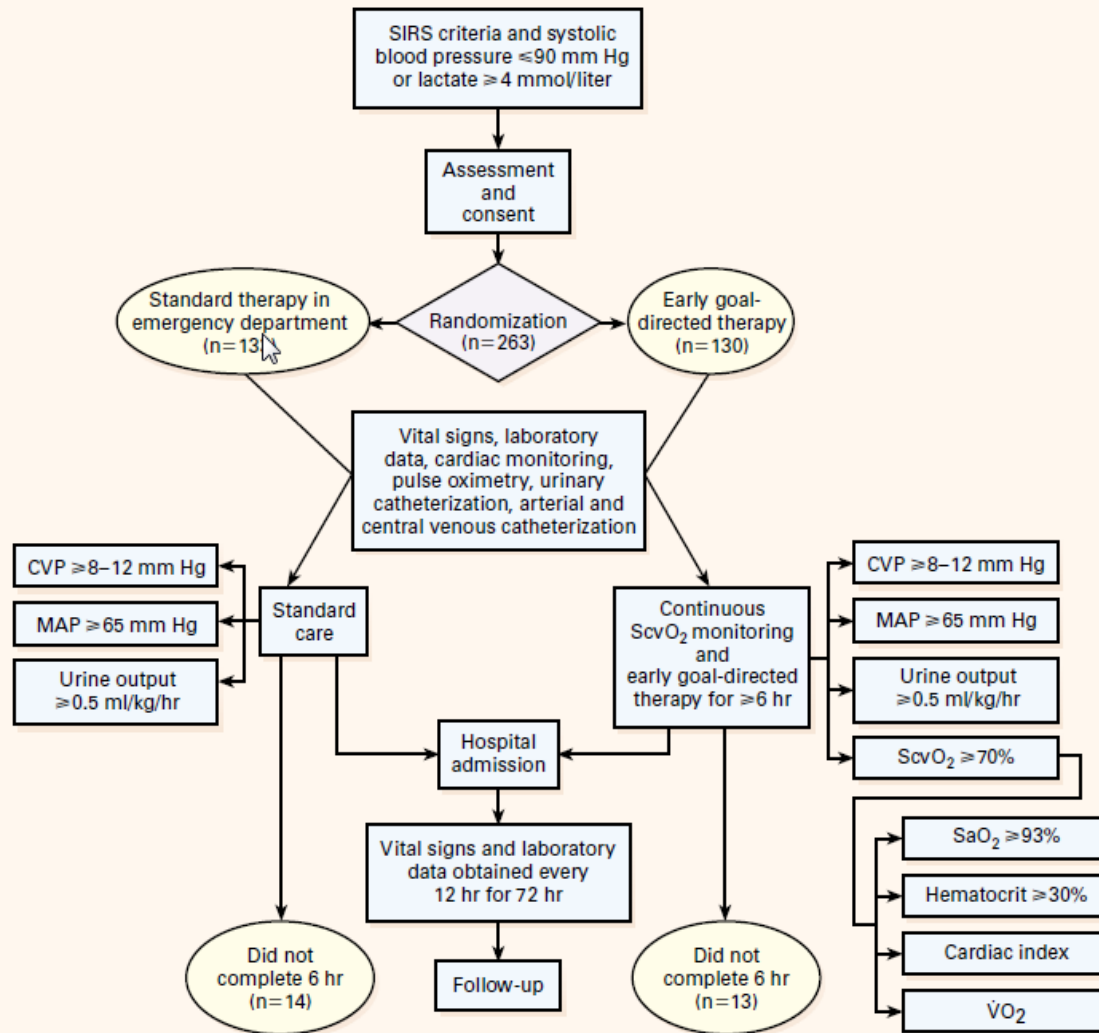


In-hospital mortality

STANDARD THERAPY (N= 133)	EARLY GOAL-DIRECTED THERAPY (N= 130)
no. (%)	
59 (46.5)	38 (30.5)

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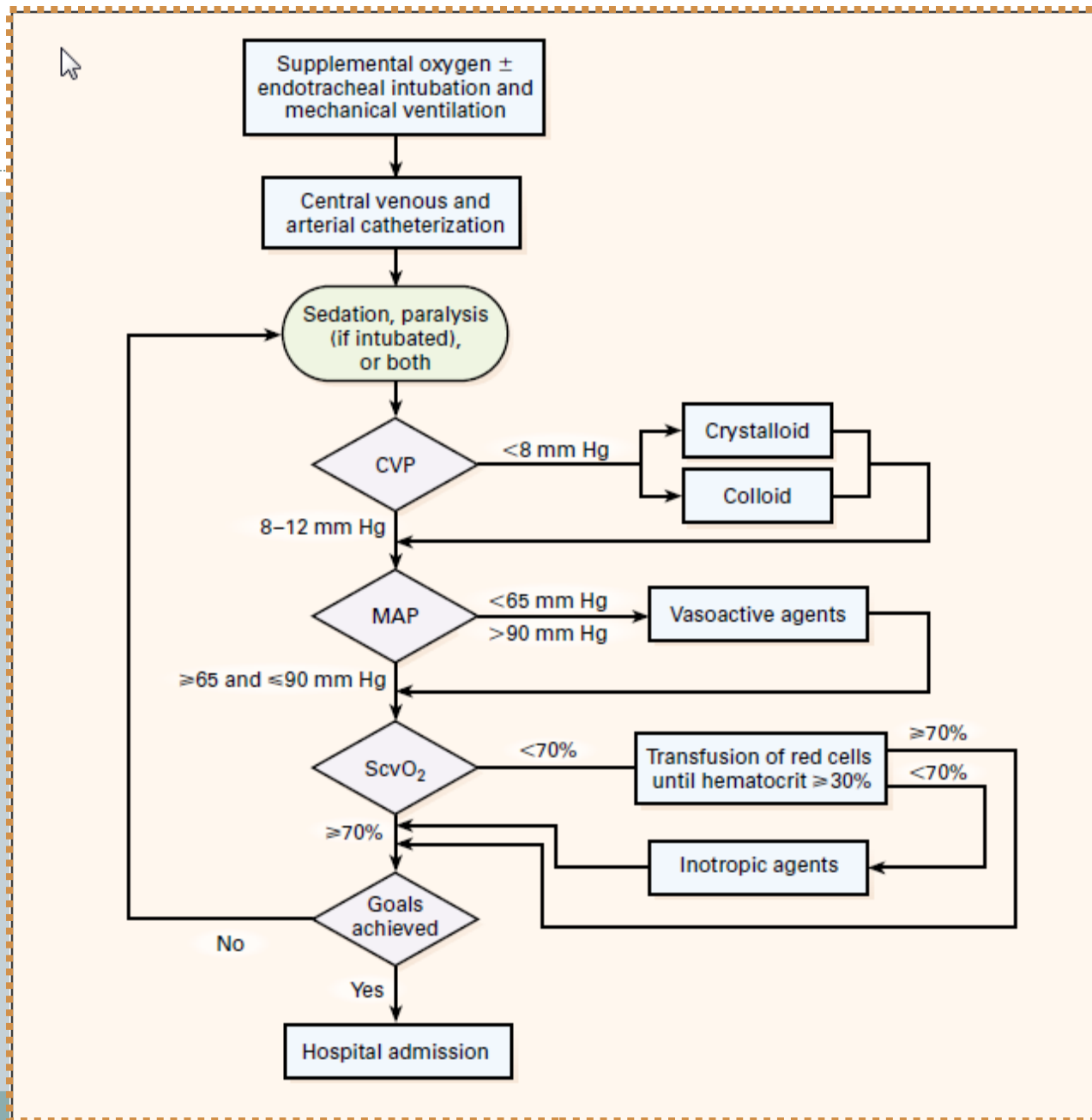


TABLE 4. TREATMENTS ADMINISTERED.*

TREATMENT	HOURS AFTER THE START OF THERAPY		
	0-6	7-72	0-72
Total fluids (ml)			
Standard therapy	3499±2438	10,602±6,216	13,358±7,729
EGDT	4981±2984	8,625±5,162	13,443±6,390
P value	<0.001	0.01	0.73
Red-cell transfusion (%)			
Standard therapy	18.5	32.8	44.5
EGDT	64.1	11.1	68.4
P value	<0.001	<0.001	<0.001
Any vasopressor (%)†			
Standard therapy	30.3	42.9	51.3
EGDT	27.4	29.1	36.8
P value	0.62	0.03	0.02
Inotropic agent (dobutamine) (%)			
Standard therapy	0.8	8.4	9.2
EGDT	13.7	14.5	15.4
P value	<0.001	0.14	0.15
Mechanical ventilation (%)			
Standard therapy	53.8	16.8	70.6
EGDT	53.0	2.6	55.6
P value	0.90	<0.001	0.02
Pulmonary-artery catheterization (%)‡			
Standard therapy	3.4	28.6	31.9
EGDT	0	18.0	18.0
P value	0.12	0.04	0.01

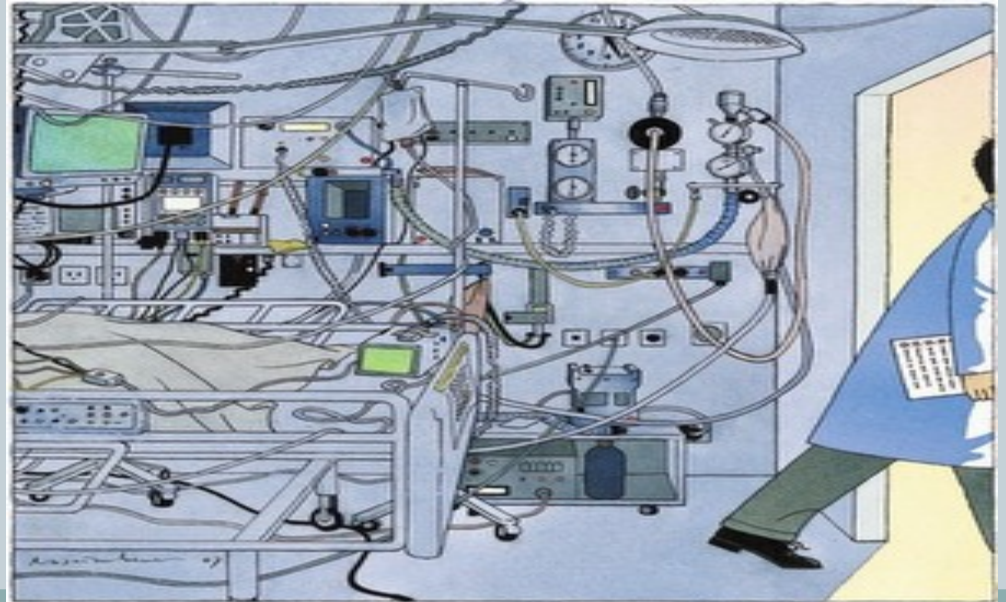
*Plus-minus values are means ±SD. Because some patients received a specific treatment both during the period from 0 to 6 hours and during the period from 7 to 72 hours, the cumulative totals for those two periods do not necessarily equal the values for the period from 0 to 72 hours. EGDT denotes early goal-directed therapy.

†Administered vasopressors included norepinephrine, epinephrine, dopamine, and phenylephrine hydrochloride.

‡All pulmonary-artery catheters were inserted while patients were in the intensive care unit.



- **SONUÇTA:** Hasta daha acil serviste iken başlanan **erken hedefe yönelik tedavi** ciddi sepsis ve septik şoklu hastalarda **iyi sonuç** ve **daha düşük mortalite** elde edilmesini sağlamaktadır.



Intensive Care or IT Service Management?



The role of the ED in stabilizing and significantly improving outcomes in critically ill patients must be emphasized. Recently, there have been many studies that have concluded improved outcomes in patients with severe sepsis and septic shock treated with early goal-directed therapy in the ED. Rivers and colleagues [9] established that there were significant short and long term benefits in early goal-directed therapy of critically ill patients in the ED. The authors concluded that there was an absolute reduction of 16% in hospital mortality. After ICU admission, goal directed therapy group required less fluid, vasopressors, mechanical ventilation, and pulmonary artery catheterization. Other studies have concluded that a significant reversal of physiologic derangement could occur during a patient's ED stay [10]. All of these factors support the vital role of ED management in providing intensive care toward critically ill patients.

Non-invasive ventilation and continuous positive pressure ventilation in emergency departments: where are we now?

R Bolton,¹ A Bleetman²

Emerg Med J 2008;**25**:190–194. doi:10.1136/emj.2007.049072

- CPAP ve NIV, ASY olan hastada güvenilir ve etkili bir ventilasyon desteği tedavisidir. Acil servislerde erken uygulanırsa entübasyon oranını, entübasyona bağlı gelişecek komplikasyonları ve genel olarak mortaliteyi azaltır.
- Kardiyopulmoner ödem ve KOAH akut alevlenmede öncelikli kullanılması önerilen bir tedavi yöntemidir.

CPAP and NIV are safe and effective methods of assisting ventilation in patients with ARF. Traditionally, CPAP and NIV have been seen as treatments implemented by respiratory physicians. However, patients will benefit from early implementation of these therapies which therefore should also be available in emergency departments. Patients will benefit particularly from reduced intubation rates, along with the associated risks, and an overall reduction in mortality.

Currently, there is good evidence to support the use of CPAP and NIV in CPO and acute exacerbations of COPD, but caution should be exercised for use in other conditions because there is less supporting evidence. Emergency physicians require training and education in the appropriate use of NIV.



Use of non-invasive ventilation in UK emergency departments

J Browning, B Atwood, A Gray and on behalf of the 3CPO trial group

Emerg. Med. J. 2006;23:920-921
doi:10.1136/emj.2006.038950

Aim: To describe the current use of non-invasive ventilation in UK emergency departments.

Methods: A structured questionnaire was sent to all UK emergency departments assessing 25,000 new patients annually.

Results: 222 of 233 departments completed the questionnaire. 148 currently use non-invasive ventilation (NIV). Most used NIV for either cardiogenic pulmonary oedema ($n=128$) or chronic obstructive pulmonary disease ($n=115$). Only 49 departments have protocols for NIV use and 23 audited practice.

Conclusion: NIV is commonly used in UK emergency departments. Practices vary significantly. One solution would be the development of guidelines on when and how to use NIV in emergency medicine practice.

- İngiltere'de bir çok acil servis NIV uygulamaktadır.
- Genellikle KPÖ ve KOAH'da uygulanmaktadır.
- Uygulama yöntemleri, süreleri, kullanılan maskeler vb. hepsi acil servislere göre çeşitlilik göstermektedir
- Standart protokollerin oluşturulması gerekmektedir.

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Giorgio Torri

Medical emergency team and non-invasive ventilation outside ICU for acute respiratory failure

Conclusion

In our hospital, the MET applied NIV in a wide variety of settings outside the ICU (mainly COPD, cardiogenic pulmonary oedema, and pneumonia) with a high success rate and few complications. This experience may not be generalizable to other hospitals, and patients to be treated outside an ICU should be selected and monitored with caution.

Çalışma hastalarının %42'si Acil servisten ve başarı oranı %87



Randomised controlled comparison of continuous positive airways pressure, bilevel non-invasive ventilation, and standard treatment in emergency department patients with acute cardiogenic pulmonary oedema

S D Crane, M W Elliott, P Gilligan, K Richards and A J Gray

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Background: Continuous positive airways pressure (CPAP) and bilevel non-invasive ventilation may have beneficial effects in the treatment of patients with acute cardiogenic pulmonary oedema. The efficacy of both treatments was assessed in the UK emergency department setting, in a randomised comparison with standard oxygen therapy.

Methods: Sixty patients presenting with acidotic ($\text{pH} < 7.35$) acute, cardiogenic pulmonary oedema, were randomly assigned conventional oxygen therapy, CPAP (10 cm H_2O), or bilevel ventilation (IPAP 15 cm H_2O , EPAP 5 cm H_2O) provided by a standard ventilator through a face mask. The main end points were treatment success at two hours and in-hospital mortality. Analyses were by intention to treat.

Results: Treatment success (defined as all of respiratory rate < 23 bpm, oxygen saturation of $> 90\%$, and arterial blood $\text{pH} > 7.35$ (that is, reversal of acidosis), at the end of the two hour study period) occurred in three (15%) patients in the control group, seven (35%) in the CPAP group, and nine (45%) in the bilevel group ($p = 0.116$). Fourteen (70%) of the control group patients survived to hospital discharge, compared with 20 (100%) in the CPAP group and 15 (75%) in the bilevel group ($p = 0.029$; Fisher's test).

Conclusions: In this study, patients presenting with acute cardiogenic pulmonary oedema and acidosis, were more likely to survive to hospital discharge if treated with CPAP, rather than with bilevel ventilation or with conventional oxygen therapy. There was no relation between in hospital survival and early physiological changes. Survival rates were similar to other studies despite a low rate of endotracheal intubation.

NIV özellikle CPAP Acil servislerde kardiyogenik pulmoner ödem tedavisinde güvenilir bir şekilde kullanılabilir. Entübasyon oranını azaltır. Mortalite üzerine etkisi belirsizdir.



- Emerg Med Clin North Am. 2008 Aug;26(3):835-47,
 - Noninvasive positive pressure ventilation in the emergency department.
 - Yeow ME, Santanilla JI.
 - Division of Critical Care Medicine, University of California San Francisco, 505 Parnassus Avenue, M-917 San Francisco, CA 94143-0624, USA.
 - Noninvasive positive pressure ventilation (NPPV) is becoming more commonplace, both in the ICU and also in the Emergency Department. This article addresses the rationale and mechanism of action for NPPV. A review of the indications for using NPPV and a discussion detailing the initiation of NPPV follows. NPPV has been shown to decrease length of hospital stay and the need for intubation in patients who have chronic obstructive pulmonary disease and acute cardiogenic pulmonary edema. NPPV should be considered for most patients who have respiratory distress who are being considered for intubation. After NPPV is initiated, very close monitoring and follow-up must be employed to identify those patients who are at risk for treatment failure.

OUTREACH=YERİNDE TEDAVİ



- Tüm kritik hastaların lokalizasyonu bakılmaksızın eşit kalitede bakım aldığına emin olmak için geliştirilmiş sistemdir.
- Yerinde tedavi sistemleri veya ekipleri servislerde yatan o an veya potansiyel olarak kritik bakım desteğine ihtiyaç duyan hastaların tanı ve tedavisini amaçlayan sistemlerdir.



- Medikal acil ekibi (MET) Avusturalya'da 1990'da
- Kritik bakım yerinde tedavi ekibi (CCOT) İngiltere'de 2000'de
- Hızlı cevap ekibi (RRT) 1990'larda ABD'de geliştirilmiştir.
- MET hekim önderliğinde
- CCOT ve RRT hemşire önderliğinde yürütülen ekiplerdir.



- Bu ekiplerin ve sistemin amacı;
 - 1-Risk altında olan hastayı belirleme,
 - 2-Risk altında olan hastayı bulunduğu yerde tedavi edip, iyileşmesine yardım etmek,
 - 3-Etkin kritik bakımı sağlayabilmek için referans protokollerin uygulanmasını sağlamak,
 - 4-Gerektiği zaman yoğun bakımının tecrübesini gerektirecek invaziv girişimleri ve tedavileri yapmak,
 - 5-Gerektiği zaman hastayı yoğun bakım ünitesine uygun şekilde nakil etmek,
 - 6-Servis ekibine klinik bozulmaları erken tanınması için uygun eğitimi vermek,
 - 7-Yoğun bakımdan servise çıkan hastaları takip etmek, gerekirse taburculuk sonrası ailelere tıbbi destek vermektir.



- Her erken müdahale veya yerinde tedavi ekipleri kendine uygun ve genellikle basitçe fizyolojik bozuklukları tespit edecek **ERKEN UYARI SKORLARINI** kullanmaktadır.

Use of an admission early warning score to predict patient morbidity and mortality and treatment success

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ABSTRACT

Background: Early warning scores (EWS) are used to identify physiological deterioration in patients. Studies to date have primarily focused on the correlation between trends in serially recorded EWS of inpatients and clinical outcomes. This study examined the predictive value of an EWS calculated immediately on presentation to hospital for acute medical patients.

Method: A prospective study of 225 consecutive medical admissions. Pulse, systolic blood pressure, respiratory rate, oxygen saturation and neurological status were used to calculate an EWS. Patients were divided into four score categories based on their EWS. The primary endpoints examined were intensive care unit (ICU)/coronary care

Some variations of the score include urinary output and oxygen saturations. Each parameter receives an individual score identified from the reference table that is proportional to the deviation of that parameter from the normal range. The sum of the individual scores gives a total EWS. An algorithm is then used by staff to guide the need for more frequent observations and senior medical review. The benefit of these scores among inpatient populations is established.⁴⁻⁶ An increasing modified EWS is associated with worse outcome across a range of medical and surgical specialties.⁹

Therefore, the predictive value of EWS among inpatient populations has been demonstrated

- Hastanede yatan ve kardiyak arrest olan hastaların %85'de bazen 24 saat öncesinde başlayan fizyolojik parametrelerde bozulmalar tespit edilmiş; fakat bunların %54'ünün ya geç fark edildiği; yada %69'unun yetersiz tedavi edildiği bulunmuştur.
- Erken uyarı skorları (EWS) risk gelişen veya gelişebilecek hastaların erkenden tesbiti için geliştirilmiş basitçe yatak başında bakılabilen bazı fizyolojik parametrelerle yapılan skorlamalardır.

Table 1 EWS used in this study

Score	3	2	1	0	1	2	3
Heart rate	<40	41–50		51–100	101–110	111–129	>130
Systolic blood pressure	<80	81–90	91–100	101–199		>200	
Respiratory rate	<8			9–19	20–25	25–29	>30
Temperature		<35		35.1–38		38–39.5	>39.5
Central nervous system				Alert	Responds to voice or newly confused	Responds to pain	Unresponsive
SpO ₂	<85%	85–89%	90–94%	>95%			

EWS, early warning score; SpO₂, peripheral oxygen saturation.

ORIGINAL ARTICLE

Validation of physiological scoring systems in the accident and emergency department

C P Subbe, A Slater, D Menon, L Gemmell

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Details of the three scoring systems are available online at <http://emjonline.com/supplemental>.

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Background: Scoring systems that weigh the degree of abnormality of bedside observations might be able to identify patients at risk of catastrophic deterioration.

Objectives: To establish a frequency distribution for typical physiological scoring systems and to establish the potential benefit of adding these to an existing triage system in accident and emergency departments.

Methods: Physiological data were collected from 53 unselected emergency department admissions, from 50 patients admitted from the emergency department to intensive care, and from 50 patients admitted from emergency department to general wards and then to intensive care. Three different physiological scores were calculated from the data. Identification of sick patients by the scores was compared with triage information from the Manchester Triage System (MTS).

Results: Most patients admitted to the emergency department would not be identified as critically ill with the aid of physiological scoring systems. This was true even for patients who were admitted to intensive care. Only in 0-8% of unselected patients did the scores indicate increased risk. In 100 patients admitted to the intensive care, adding of medical emergency team call-out criteria, Modified Early Warning Score or Assessment Score for Sick patient Identification and Step-up in Treatment would identify none, seven or one patient in addition to those triaged as orange and red by the MTS.

Conclusions: Introduction of a physiological scoring system would have identified only a small number of additional patients as critically ill and added little to the triage system currently in use.

- Kritik hastaların geç belirlenmesi gerek servislerde yatan gerekse acil servislere başvuran hastalarda artmış kardiyak arrest ve mortalite ile gider.
- Yatak başında bazı fizyolojik parametrelerin gözlenmesi gelişebilecek bazı problemlerin önceden belirlenmesinde faydalı olabilir.
- Acil servisten direk yatan hastaların prognozu, servisten yatan hastalara göre daha iyidir. Çünkü çoğu acil servis hızlı müdahale edilmesi gereken ve yoğun bakım ünitesine yattığında fayda görebilecek hastayı belirleyebilecek iyi triaj sistemlerine sahiptir.

Table 1 Calculation of the modified Early Warning Score

Score	3	2	1	0	1	2	3
Systolic blood pressure, mmHg	<70	71-80	81-100	101-199	-	>200	-
Heart rate, bpm	-	<40	41-50	51-100	101-110	111-129	>130
Respiratory rate, rpm	-	<9	-	9-14	15-20	21-29	>30
Temperature, °C	-	<35	-	35.0-38.4	-	>38.5	-
AVPU	-	-	-	A	V	P	U

AVPU, alert, responding to voice, responding to pain, and unresponsive.

- mEWS 1-15 arasında değer alır.
- **mEWS ≥ 5** artmış ölüm riski ve artmış yoğun bakım ünitesi yatışı ile birlikte gider.
- mEWS ≥ 3 ise takip eden hemşirenin ilgili doktoru veya hastane içerisindeki RRT, MET, CCORT veya PART gibi erken uyarı sistemlerini harekete geçirmesi beklenir.
- Tek bir skor değerinin değil, belirli zaman aralıkları ile yapılan takip sırasındaki değişimlerin anlamlı olduğu bildirilmektedir.

ORIGINAL ARTICLE

Use of the patient at risk scores in the emergency department: a preliminary study

J E Rees, C Mann

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Objectives: To assess the feasibility of using a modified patient at risk (PAR) scoring system in the emergency department.

Methods: Modified PAR scores were calculated for 30 triage category 1 and 2 patients on arrival in the department and at 15 minutes after the initial resuscitation was underway using observation datasheets designed for this project.

Results: Three patients (10%) were admitted to the intensive care unit (ICU). Twenty six patients (88%) were admitted to a general ward and one was discharged. Fifty per cent of the patients had a PAR score of 3 or more on arrival. Eighty seven per cent of the general ward patients had a PAR score that was stable or improved during the first 15 minutes of resuscitation. The other three ward patients, whose scores deteriorated, were assessed in the emergency department by the appropriate teams and deemed appropriate for ward beds. Two of the three ICU patients deteriorated in the resuscitation room. The third ICU patient maintained a PAR score of 2 but had such overwhelming injuries that ICU was the only option.

Discussion: Serial PAR scores are far more informative than isolated scores. This study suggests that serial PAR scores could be used in three ways in the emergency department. Firstly, in the assessment of individual patients and their response to initial resuscitation. Secondly, as a guide to the need further specialist assessment before leaving the emergency department. Finally, as an audit tool to measure the effectiveness of initial treatments in large numbers of patients during the initial resuscitation.

Table 1 Modified PAR scoring system used in this study

Score	3	2	1	0	1	2	3	Score
CNS response				Alert	Drowsy	Pain		
Respiratory/min		<8		9-14	15-20	21-30	>30	
Pulse rate		<40	40-50	51-100	100-110	111-130	>130	
Systolic blood pressure	<70	71-80	81-100	101-199		>200		

- **PAR** skoru serviste yatan hastaların genel durumunda bozulmayı erken tespit edip, erken müdahalesini sağlayan **ERKEN UYARI SİSTEMİ** skorlarından biridir.
- Acil servisteki hastaların ilk müdahale ve resüsitasyonu sonrasındaki gidişatını belirlemek ve uygun yere (servis, yoğun bakım, ara bakım vb) yatırılmasını sağlamak içinde kullanılabilmektedir.
- **PAR_{≥3}** ise hastanın yoğun bakım yatışı ve/veya ileri uzman görüşü alınması açısından değerlendirilmesi önerilmektedir.

Predictive value of the modified Early Warning Score in a Turkish emergency department

Erol Armagan^a, Yusuf Yilmaz^b, Omer Fatih Olmez^b, Gozde Simsek^a and Cuma Bulent Gul^b

Objective The modified Early Warning Score (mEWS) is a triage instrument that promises to predict patient disposition and clinical outcome in emergency departments (EDs). We investigated whether mEWS can predict death, hospital admission, intensive care unit (ICU) admission, and in-hospital deaths in a Turkish setting.

Methods We conducted an ED-based prospective study of 309 patients who presented to an academic medical center. The mEWS was recorded in all patients on ED admission. A mEWS >4 was used to define patients at high-risk for the study outcomes.

Results Patients categorized as being at high-risk either were admitted to ICU ($n=23$) or to hospital ($n=37$) 56.6% of the time, or died in ED ($n=16$) or in hospital ($n=29$)

those with a score less than 5. Patients with high-risk mEWS were 35 times more likely to die in ED and 14 times more likely to die in hospital than those presenting with a low-risk score.

Conclusion We conclude that scores on the mEWS predict ICU admission as well as ICU and in-hospital deaths. *European Journal of Emergency Medicine* 15:338–340 © 2008 Wolters Kluwer Health | Lippincott Williams & Wilkins.

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Keywords: emergency, nursing, risk screening, triage

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- Kritik hasta için skorlama sistemleri genellikle yoğun bakıma yattıktan sonra kullanılmaya başlar. Bu skorlamalar;
- Organ yetmezliğinin derecesi,
- Mortalite olasılığı,
- Klinik çalışmalarda hastalar veya yoğun bakımlar arası karşılaştırılma yapılması ve
- Bir takım ilaçların kullanılması için endikasyon belirlenmesi için **kullanılabilir.**





- Yoğun bakım ünitelerinde en sık **APACHE 2** ve **3**, **SAPS 2**, **SOFA** ve **MODS** kullanılır.
- Travma hastalarında en sık **GCS**, **TISS**, **TISS-28**, **TS**, **re-TS**, **TRISS**, **ICISS** vb gibi skorlar kullanılabilir. Bu skorlar mortalite olasılığının belirlenmesinden daha çok, monitorizasyon sıklığını ve kullanılacak terapötik yaklaşımları ve maliyeti belirler.



- Kritik hastaları takip eden acil servisler değişik skorlama sistemlerini kullanmaktadır. Yoğun bakımda kullanılan skorlar acil servisler için uygun değildir. Bu nedenle değişik skorlar acil servisler için geliştirilmiştir.
- **SIRS kriterleri+kan laktat seviyesi ≥ 4 mmol/L** olması acil serviste infeksiyondan şüphelenilen ve normotansif olan hastada septik şok gelişme olasılığını belirlemek (spesifitesi %96 korele) ve hastaneye ve yoğun bakıma yatış olasılığını bulmak (spesifitesi %98.2) için kullanılmaktadır.
- **Pnömoni Ağırlık İndeksi** acil servise başvuran toplumda kazanılmış pnömonili hastalarda yatış kararı ve yatacağı servisi belirlemek için kullanılmaktadır.

Physiologic scoring systems developed and implemented in the emergency department setting

ED scoring system	Reference	Objectives and method	Summary results	Application
MEDS	[61]	Prospective cohort study in ED patients at risk for infection, using multivariate analysis to identify independent predictors of death	Development and internal validation of a prediction rule to risk stratify ED patients at risk for infection and predict their mortality. The areas under the ROC curve were 0.82 for the derivation set ($n = 2070$) and 0.78 for the validation set ($n = 1109$)	MEDS accurately identifies correlates of death in ED patients at risk for infection and is useful in stratification of patients according to mortality risk
RAPS	[82]	Prospective multi-institutional study of diverse group of transported patients to define the predictive power of RAPS	Predictive power of RAPS for mortality using the most deranged physiologic parameters pre- and post-transport was high ($n = 1881$), with ROC curves exhibiting predictive power similar to that of APACHE II	RAPS is a strong predictor of mortality and is highly reliable in predicting severity of physiologic instability before and after transport
REMS	[67]	Prospective cohort study to evaluate the accuracy of RAPS in predicting mortality and length of stay in nonsurgical ED patients. Age and Sao_2 were added to RAPS to derive REMS	REMS was superior to RAPS in predicting inpatient mortality, with area under the ROC curve of 0.85 for REMS and 0.65 for RAPS ($n = 12,006$)	REMS is an excellent predictor of inpatient mortality and length of stay for a wide range of nonsurgical ED patients
MEES	[69]	Prospective study to develop a rapid, simple scoring system to evaluate prehospital intervention based on objective parameters	Development and evaluation of MEES as a scoring system to evaluate prehospital clinical treatment. MEES was found to be an efficient and effective method for determining the impact of ED intervention ($n = 356$)	MEES is a reliable method for assessing prehospital intervention
SARS	[71]	Prospective study to validate SARS (four-item symptom and six-item clinical) screening scores in predicting SARS in febrile ED patients in endemic areas	Previously developed SARS screening scores ($n = 70$) were examined in 239 patients with fever. Eighty-two patients had SARS. The scores exhibited a combined sensitivity of 90.2% and specificity of 80.1% for SARS	SARS screening scores are potential screening methods for SARS in mass outbreaks
PRISA	[74]	Prospective study of pediatric severity of illness assessment, using univariate and multivariate logistic regression analyses to develop a model predicting hospital admission	Development of PRISA as an assessment tool to predict pediatric hospital admission from the ED. Areas under the ROC curve were 0.86 and 0.83 for the development ($n = 2146$) and validation ($n = 537$) samples, respectively, in predicting pediatric ED admission	PRISA can reliably predict pediatric hospital admission using data during the ED stay

APACHE, Acute Physiology and Chronic Health Evaluation; ED, emergency department; MEDS, Mortality in Emergency Department Sepsis; MEES, Mainz Emergency Evaluation Systems; PRISA, Pediatric Risk of Admission; RAPS, Rapid Acute Physiology Score; REMS, Rapid Emergency Medicine Score; ROC, receiver operating characteristic; Sao_2 , oxygen saturation; SARS, Severe Acute Respiratory Syndrome.

- Bu skorlardan sık kullanılan ve önemli olan iki tanesi **MEDS** (Mortality in Emergency Department Sepsis Score) ve **REMS** (The Rapid Emergency Medicine Score)'dir.



- MEDS Acil serviste infeksiyon için riski olanı ve mortalite için risk kategorisini belirlemek için kullanılır.

- Son dönem hastalık varlığı
- Taşipne veya hipoksi varlığı
- Septik şok varlığı
- Plt sayısının $<150.000/\text{mm}^3$ olması
- Bant formasyonundaki nötrofil sayısının $>\%5$ olması
- Yaş >65 olması
- Alt solunum yolu infeksiyonu varlığı
- Bakımevinden gelme
- Mental durumda değişiklik olması

- Hasta bu kriterlerin varlığına ve sayısına göre ölüm için;

Çok Düşük riskli-Düşük riskli-Orta riskli-Yüksek riskli ve Çok yüksek riskli olarak değerlendirilir

Hemodinamik Monitörizasyon



- Yeterli doku perfüzyonunun sağlanması, kritik hastanın resüsitasyonunda merkezi rol oynar.

Hemodinamik monitörizasyon sık endikasyonları:



- Şok
- Pulmoner Ödem
- Perioperatif yüksek riskli cerrahi
- Hipertansif acil olgular
- Artmış intrakraniyal basınç



- Acil serviste baslanan ağır sepsis ve septik şoktaki erken hedefe yönelik tedavi sadece mortaliteyi değil; mekanik ventilasyon ve pulmoner arter kateter takılması ihtiyacını da azaltmaktadır.
- Aynı şekilde akut solunum yetmezliğinde acil serviste baslanan NIMV hem prognozu iyileştirmekte (entubasyon ve yoğun bakıma yatış oranını azaltmakta) hem de YBU'de kalış süresini ve maliyeti azaltmaktadır.



- Acil servislerde optimal tedavi alan hastalarda YBU'ndeki yatış süresi azalır; erken hedefe yönelik tedavi ve NIMV uygulanması yoğun bakımdaki yatış süresini ve maliyeti azaltır.



- Rivers ve arkadaşlarının gösterdiği gibi septik soklu hastaya erken hedefe yönelik tedavinin daha acil serviste iken başlanması morbidite ve mortaliteyi azaltmaktadır. Bu nedenle acil servislerde sepsis ve septik şoklu hastanın erken tanısı, erken tedavisi önem kazanmaktadır.

MEKANİK VENTİLATÖR





- **Kritik hasta için skorlama sistemleri genellikle yoğun bakıma yattıktan sonra kullanılmaya baslar. Bu skorlamalar;**
- Organ yetmezliğinin derecesi,
- Mortalite olasılığı,
- Klinik çalışmalarda hastalar veya yoğun bakımlar arası karşılaştırılma yapılması
- Bir takım ilaçların kullanılması için endikasyon belirlenmesi için kullanılabilir

Skorlama Sistemleri



- Hasta bakımının, yönetiminin kalitesini değerlendirmek ve geliştirmek için,
- Klinik çalışmalarda temel olarak kullanmak ve kalitesini artırmak için,
- Kaynak yönetimine yardımcı olmak için
- Prognoz belirleyecek kararların doğruluğunu denetlemek ve geliştirmek için,
- Klinik yaklaşımların ve yolların etkilerini objektif olarak ölçmek ve karşılaştırmak için
- Prognoz belirlemek için kullanılır.



- Yoğun bakım ünitelerinde en sık APACHE 2 ve 3, SAPS 2, SOFA ve MODS kullanılır.
- Travma hastalarında en sık GCS, TISS, TISS- 28, TS, re-TS, TRISS, ICISS vb gibi skorlar kullanılabilir.
- Bu skorlar mortalite olasılığının belirlenmesinden daha çok, **monitörizasyon sıklığını ve kullanılacak terapötik yaklaşımları ve maliyeti belirler**

SONUÇTA



- Hastaların yoğun bakım ünitesine yatmadan önce geçirdiği süreç ve aldığı tedaviler prognozu belirlemede çok önemlidir.
- Bu süreci bir kısım ve artan sayıda hasta grubu acil servislerde geçirmektedir.



- Acil servis alt yapısının ve ekipmanının kritik hastaya hizmet verecek şekilde düzenlenmesi, eğitimler yapılması ve yoğun bakım-acil tıp arasında kılavuzlar protokoller oluşturulması veya hasta yönetimine acil servisten itibaren yoğun bakım ekibinin başlaması ve yönlendirmesi SONUÇLARI son derece olumlu etkileyecektir.
- Sadece hasta açısından ve klinik sonuçlar yönünden değil; SOSYOEKONOMİK getiriler yönünden de anlamlıdır.



- Acil servisteki kritik hastaların yönetimi gelişmektedir.
- Günümüzde kritik hastaların acil servisteki yönetiminin merkez bir role sahip olduğu konusunda yeterli bir kanıt vardır.
- Bu kritik hastaların yönetimindeki acil servis doktorların olağan üstü etkisini anlamamız acil servis asistanlarının yoğun bakıma yönelmesine büyük katkı sağlamıştır.



- As the field of emergency medicine continues to mature, the ED physician must take notice of the potential risk areas within the management of the critically ill patient to continue to improve these patients' short- and longterm survival.



The management of the critically ill patient in the emergency department is an evolving process. Currently there is sufficient evidence substantiating the central role of the ED in the management of critically ill patients. Understanding the tremendous impact ED physicians have in the care of critically ill patients will serve as an impetus for emergency medicine residents to pursue a critical care subspecialty. The recent implementation of an emergency medicine critical care fellowship at the University of Maryland Shock Trauma Center is a reflection of this increased awareness [29]. With the continuous increment of critically ill patients presenting to EDs throughout the country, the nationwide shortage of critical care physicians, and the limited availability of ICU beds throughout hospital systems, there will be an increased focus on managing these patients in the ED. As the field of emergency medicine continues to mature, the ED physician must take notice of the potential risk areas within the management of the critically ill patient to continue to improve these patients' short- and long-term survival.

SONUÇTA

- Hastaların yoğun bakım ünitesine yatmadan önce geçirdiği süreç ve aldığı tedaviler prognozu belirlemede çok önemlidir.
- Bu süreci bir kısım ve artan sayıda hasta grubu acil servislerde geçirmektedir.
- Acil servis alt yapısının ve ekipmanının kritik hastaya hizmet verecek şekilde düzenlenmesi, eğitimler yapılması ve yoğun bakım-acil tıp arasında kılavuzlar protokoller oluşturulması veya hasta yönetimine acil servisten itibaren yoğun bakım ekibinin başlaması ve yönlendirmesi **SONUÇLARI** son derece olumlu etkileyecektir.
- Sadece hasta açısından ve klinik sonuçlar yönünden değil; **SOSYO EKONOMİK** getiriler yönünden de anlamlıdır.

Original research

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Critical Care in the Emergency Department: An assessment of the length of stay and invasive procedures performed on critically ill ED patients

Robert S Green^{*1,2} and Janet K MacIntyre^{†1}

Abstract

Introduction: Critically ill patients commonly present to the ED and require aggressive resuscitation. Patient transfer to an ICU environment in an expedient manner is considered optimal care. However, this patient population may remain in the ED for prolonged periods of time. The goal of this study is to describe the ED length of stay, and the invasive procedures performed in critically ill ED patients.

Methods: This is a retrospective medical record review of all patients who presented to the study center over a 1 year period. Patient demographic data, in addition to the times of ED presentation and ICU admission were recorded. Invasive procedures performed in the pre-hospital, ED and the initial 24 hours of ICU care were also recorded.

Results: Overall, 178 patients' required direct admission to an ICU from the ED, with a mortality rate of 21.9%. The median LOS in the ED for critically ill patients requiring ICU admission was 4.9 h (mean 6.5 h, range 1.4-28.2 h). Seventy percent of patients (125/178, 70.2%) required endotracheal intubation with the majority (118/125, 94.4%) being performed in the ED (80/125, 64.0%) or the prehospital setting (38/125, 30.4%). Central venous access was obtained in 56/178 patients (31.5%), with 17.9% (10/56) completed in the ED. Similarly, arterial catheters were inserted in 99/178 patients (55.6%) with 14.1% (14/99) inserted in the ED.

Conclusion: Critically ill patients are managed in the emergency department for a significant length of time. Although the majority of airway intervention occurs in the prehospital setting and ED, relatively few patients undergo invasive procedures while in the emergency department.

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Table 3: Invasive procedures completed in patients admitted to an ICU directly from the ED

	Prehospital (n, #)	Emergency Department	ICU <6 h [*]	ICU 6-24 h ^{\$}
Endotracheal Intubation 125/178 (70.2%)	38/125 (30.4%) Paramedic 38/38	80/125 (64.0%) Staff: 35/80 Resident: 15/80 Paramedic: 4/80 Not recorded: 26/80	4/125 (3.2%) Staff:0/4 Resident: 4/4	3/125 (2.4%) Staff: 0/3 Resident: 3/3
Central venous catheter 56/178 (31.5%)	0	10/56(17.9%) Staff:3/10 Resident: 6/10 Not recorded: 1/10	30/56 (53.6%) Staff: 3/30 Resident:27/30	16/56 (28.6%) Staff: 1/16 Resident: 14/16 Other%:1/16
Arterial Line Catheter 99/178 (55.6%)	0	14/99 (14.1%) Staff: 3/14 Resident: 9/14 Not recorded: 2/14	71/99 (71.7%) Staff:8/71 Resident: 60/71 Other: 3/71	14/99 (14.1%) Staff: 3/14 Resident:8/14 Other:3/14
Chest Tube 8/178 (4.5%)	0	4/8 (50.0%) Staff: 1/4 Resident: 1/4 Not recorded: 2/4	1/8 (12.5%) Staff:0/1 Resident0/1: Other:1/1	3/8 (37.5%) Staff:0/3 Resident3/3:

(n = number of patients with ED diagnosis)

^{*} Procedure completed within 6 hours of ICU admissions

^{\$} Procedure completed >6 hours after ICU admission, but within first 24 hours of ICU admission.

% Other: hospitalist, medical student

Clinical review: Emergency department overcrowding and the potential impact on the critically ill

Robert M Cowan¹ and Stephen Trzeciak²

Conclusion

Critical care is often performed in the ED, such that there is a mutual link between the ED and the ICU. The available data strongly suggest that ED care of critically ill patients can affect ICU costs, both positively and negatively. More proximal delivery of critical care in the ED, before ICU admission, may decrease downstream ICU costs and yield significant system savings. Conversely, ICU practices can also have an impact on the ED. Optimizing the cost-effectiveness of critical care should involve both the ED and ICU. Future research should examine the effect of ED interventions on subsequent ICU costs as well as on patient outcomes. Most importantly, critical care must be seen as a continuum of care so that maximum patient benefit may be achieved and hospital costs minimized.

Competing interests

The author(s) declare that they have no competing interests.

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Descriptive epidemiology of adult critical care transfers from the emergency department

A Gray, S Gill, M Airey, R Williams

Aims: To describe the nature, frequency, and characteristics of adult critical care transfers originating from the emergency department (ED).

Methods: A one year prospective regional descriptive study using multiple data sources of all critically ill adults transferred from an ED or a minor injuries unit (MIU) within the former Yorkshire Regional Health Authority Area or into a regional critical care facility if originating from an ED or MIU elsewhere.

Results: 29 EDs transferred 349 adults into the regional critical care facilities. The median number of transfers per department within the region was 18 (range 1 to 42). Seventeen were transferred from outside the region. A total of 263 (75%) patients were transferred for specialist care and 76 (22%) for non-clinical reasons. Altogether 294 (84%) were admitted to intensive care or a high dependency unit at the receiving hospital. The in-hospital documented mortality rate was 26%. A total of 170 patients (49%) had traumatic pathology of which 101 were principally transferred for management of a head injury. Median time in the ED was 3 hours 5 minutes (range 11 minutes to 17 hours 47 minutes). In 146 (42%) patients the decision to transfer was primarily made by the emergency medicine clinician. A total of 251 (72%) patients were intubated. The documented critical incident rate was 15%.

Conclusion: Trauma is the most common reason for transfer of the critically ill adult from the ED. A significant number of patients are transferred, however, with medical and surgical conditions and for non-clinical reasons. There continues to be problems with the quality of care that these patients receive. Emergency medicine clinicians must be actively involved in the development of regional critical care systems as a significant proportion of all critically ill adults transferred originate from the ED.

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Table 1 Patients transferred from an ED (n=349). All figures median and IQR unless stated otherwise

Age	56 (32 to 62)
Male to female ratio	2.5 to 1
Number of patients >1 transfer	33 (9%)
LOS referring ED (n=310, available data)	03:05 hours (02:15 to 04:18)
LOS receiving hospital (n=294, available data)	8 days (2 to 20)
LOS critical care receiving hospital (n=288, 250 available for analysis)	3 days (1 to 10)
Mortality rate	26%

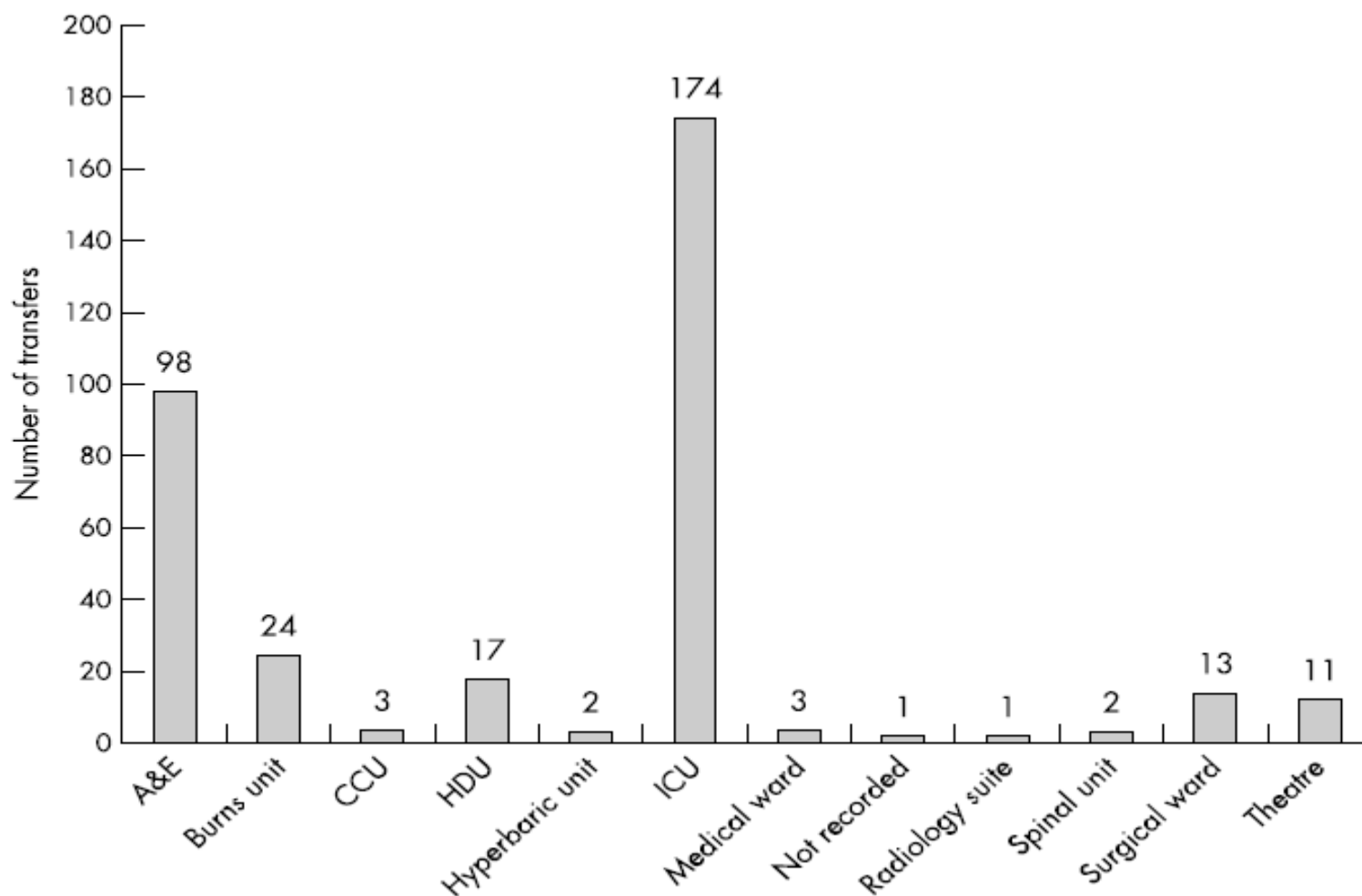
LOS, length of stay.

ORIGINAL ARTICLE

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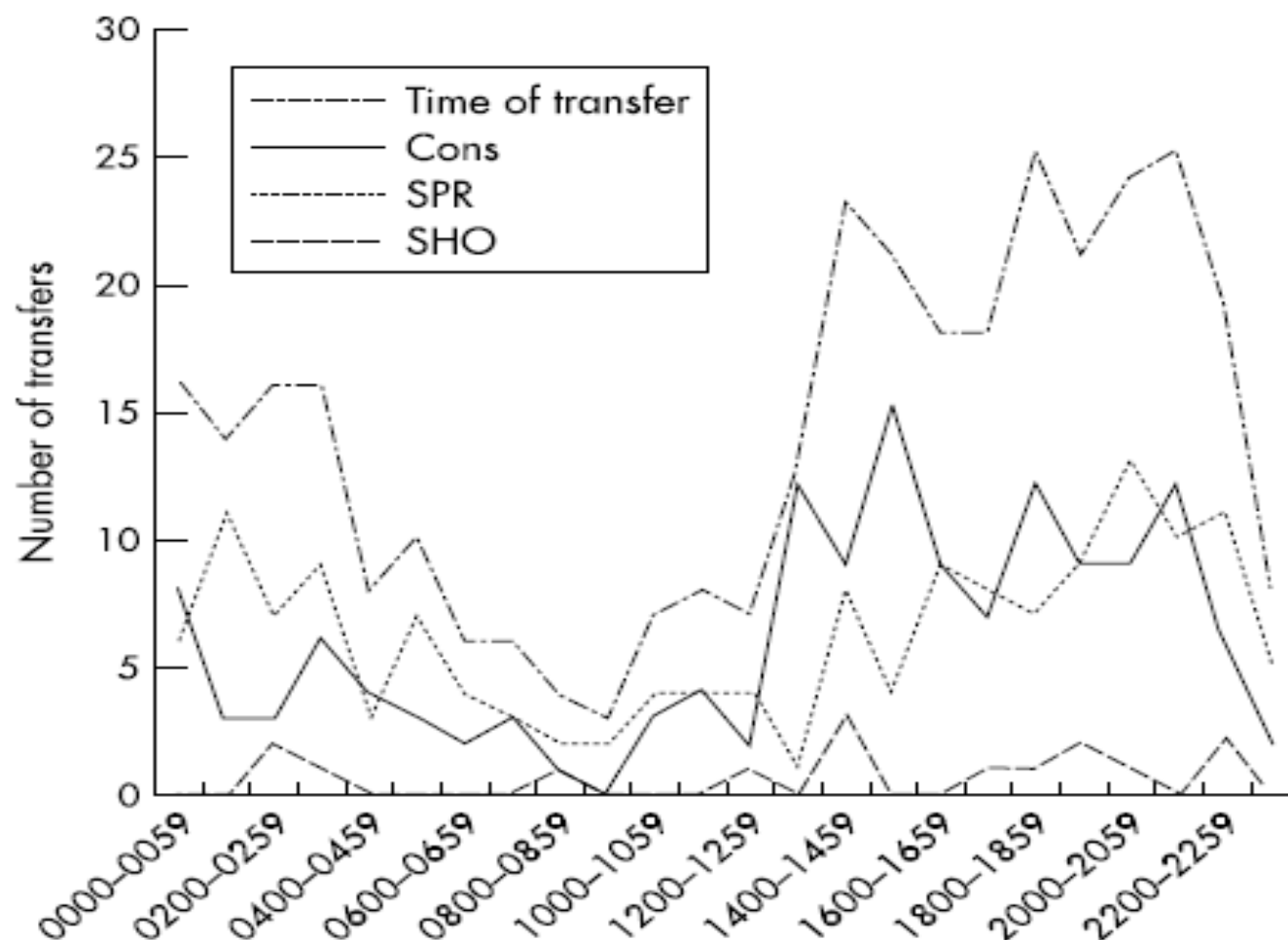


Figure 3 Seniority of decision making staff and time of day.

Emergency physicians in critical care: a consultant's experience

T Brown

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There is a growing interest in the interface between emergency medicine and critical care medicine. Previous articles in this journal have looked at the opportunities and advantages of training in critical care medicine for emergency medicine trainees. In the UK there are a small number of emergency physicians who also have a commitment to critical care medicine. This article describes a personal experience of such a job, looking at the advantages and disadvantages. Depending upon future developments in the role of emergency medicine in the UK, together with the proposed expansion in critical care medicine, such posts may become more common.

