Examination of EMS Decision Making in Determining Suitability of Patient Diversion to Urgent Care Centers

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Abstract: Widespread use of Emergency Medicine Services (EMS) for non-emergency care has increased recently, causing overcrowding of the Emergency Department (ED). The increased availability of urgent care centers (UCCs), with their ability to see large numbers of unscheduled patients with more acute presentations, may offer a viable option for many EMS systems to divert non-emergent cases. Using a survey-based study combined with retrospective chart review, EMS provider ability to determine patient suitability for diversion to UCCs was assessed. Results indicated a rate of inappropriate diversion of 11.6%. UCCs may be an alternative option for EMS transport, however strict protocols with medical direction are needed.

Keywords: emergency medical services; urgent care; diversion; crowding

1. Introduction

Widespread use of Emergency Medicine Services (EMS) for non-emergency care has increased recently, causing overcrowding of the Emergency Department (ED). A 2012 study showed that the proportion of EMS transports that were medically unnecessary has also increased from 13% to 17% [1]. A potential strategy to offload non-emergent patients from the ED would be to permit EMS personnel determination of patient suitability for transport to an alternative destination. Patient diversion to non-ED settings may also be a useful strategy for decreasing ED volumes in the setting of disasters. International and domestic studies have examined the possibility of patient diversion by EMS to alternate care settings [2–4]. However, a meta-analysis has provided inconclusive evidence on whether EMS providers can accurately determine non-emergent from emergent patients [4,5]. No recent study has addressed the question of appropriate diversion by EMS. Appropriate diversion may represent an effective means of limiting or eliminating excess cost and resource utilization.

Patient determination to seek care in an ED or another setting is multifactorial and includes limited access to primary care, patient-perceived urgency, convenience and a belief that their condition requires resources offered by a particular healthcare provider [6–9]. Urgent Care Centers (UCCs) offer expedited access to a healthcare provider and medical services to patients with non-life or limb threatening medical concerns [10]. Ninety-six percent of UCCs are open seven days a week and at least four hours a day. Ninety percent report a waiting time of less than thirty minutes to see a provider. Patient utilization of UCCs is also increasing with 89% of UCCs reporting an increase in patient volume in 2014 [11]. While it is not yet clear why patients choose to seek treatment in an ED versus a UCC, diversion of patients from an ED setting to a non-emergency medical setting such as a UCC may alleviate ED overcrowding [8,12].
This question has become timely with the rapid growth of UCCs, which may offer a new pathway for EMS diversion protocols [10]. In many places, even if EMS displayed the ability to divert patients safely, the ability to divert transport away from the ED has been restricted by the complexity and rigidity of clinic schedules, non-standardized capabilities of UCCs, and regulatory restrictions, including restricted insurer payments when patients are not transported to EDs. However, over the last decade the increased availability of UCCs, with their ability to see large numbers of unscheduled patients with more acute presentations, may offer a viable option for many EMS systems to divert non-emergent cases.

The goal of this prospective survey-based study was to examine the ability of emergency medical technicians (EMTs) to decide whether patients could be appropriately and safely diverted from an ED to a UCC. As non-emergent activation of EMS continues to increase, appropriate diversion may represent an effective means of limiting or eliminating excess cost and resource utilization. Previous investigations have relied heavily on mock decision making and advanced life support evaluation, with a 2009 systematic review and meta-analysis finding profound heterogeneity among studies and calling for more research into the practice.

2. Materials and Methods

We conducted a prospective survey-based study. EMTs transferring care of patients to the ED completed a brief survey regarding patient suitability for diversion to a UCC. Attending emergency physicians (EPs) also completed the same survey immediately following their initial history and physical examination of the patient. Concurrent medical record review was used to ascertain patient-level data, including age, gender, ED chief complaint and ED triage vital signs. Data were collected on patient encounters during local UCC operating hours. Both ED and EMS staff were blinded to the objective of the study. Our institutional review board approved this study.

This study was performed from 5 July 2016 to 11 August 2016, during normal operating hours of local UCCs from Monday to Thursday, involving an inner-city Level 1 trauma center and tertiary care university hospital with an annual ED census of 75,000 visits. EMS crews were comprised of two EMTs trained in basic life support and state-certified as EMTs.

A convenience sample of adult patients greater than 18 years of age transported to the ED by an EMS agency was included in the study. All ED patients initially assessed by the Trauma Team or by Obstetrics in the Labor and Delivery unit were excluded due to the use of a different triage system employed for these patients in both the field and the hospital.

The patient was initially assessed and managed by the treating EMT per protocol. Upon arrival to the ED, the survey was completed by the EMT after transfer of care to the ED. After initial ED evaluation and prior to the results of any diagnostic studies, the EP completed the same survey.

The answers from the EMTs and EPs regarding the survey question “Could this patient have been diverted to an urgent care center?” were tallied and compared for agreement. Through medical record review, demographic information including age and gender, chief complaint for ED visit, and ED triage vital signs were collected.

The primary outcome measure was the level of agreement between EMTs and EPs regarding diversion to a UCC. Secondary outcome measures were the level of under-triage by the EMTs as the percentage of cases in which the EMTs considered UCC disposition appropriate, but the EPs disagreed, and variables from chart review that might impact transport destination.

The level of agreement was demonstrated using both simple percent agreement calculation and Cohen’s kappa coefficient. Simple percent calculation was used to show the frequency of under-triage by the EMTs. Continuous data are presented as means with comparisons between groups performed using an independent $t$-test or Mann-Whitney U test. Values are presented with 95% confidence intervals.
3. Results

Data were collected on 235 consecutive patient encounters, 233 of which were evaluated by both an EMT and an EP. Two patients eloped from the ED prior to EP evaluation. In Table 1, diversion to a UCC was deemed appropriate by EMTs in 45 cases (19.3%, 95% CI 14.6–24.8). Thirty-five instances (15.0%, 95% CI 10.9–20) of discordance between EMT and EP determination were recorded, with 27 encounters (11.6%, 95% CI 7.9–16.3) under-triaged by EMTs who deemed the patient appropriate for transport to a UCC but inappropriate by the EP. The simple percent agreement between EMTs and EPs was 85.0% with a Cohen’s kappa coefficient of 0.426 (95% CI 0.272-0.580), signifying moderate agreement (Table 2).

Table 1. Summary of survey diversion question data.

| Transport Decision | Answer (Yes/No) | EP—Transport to UCC? | Total |
|--------------------|-----------------|----------------------|-------|
| EMT—Transport To UCC? | Yes | 18 | 27 | 45 |
| No | 8 | 180 | 188 |
| Total | 26 | 207 | 233 |

Table 2. Agreement between EMTs and EPs.

| Total Cases with Destination Agreement | 198 |
| Agreement with UCC Transport | 18 |
| Agreement with ED Transport | 180 |
| Total Cases with Destination Disagreement | 35 |
| Under-Triage | 27 |
| Over-Triage | 8 |
| Percent Agreement | 85.0% |
| Cohen’s Kappa Coefficient | 0.426 |

Demographic information, ED chief complaints, and ED triage vital signs for patients with disagreement between EMTs and EPs regarding UCC transport and for those with agreement for UCC transport are presented in Tables 3–5. Musculoskeletal concern (50%) was the most common chief complaint in cases in which both EMTs and EPs agreed with UCC transport. However, during disagreement, traumatic mechanisms (25%) were most commonly found when EMTs preferred ED transport, and gastrointestinal issues (42%) when EPs preferred ED transport. Table 6 compares data between patients with agreement for UCC transport and those under-triaged by EMTs for UCC transport from the perspectives of the EPs. Age is the only finding to be statistically significant, with a mean of 48.11 years for patients agreed upon by both EMTs and EPs for UCC transport and a mean of 58.07 for patients under-triaged by EMTs ($p = 0.0477$).

Table 3. Presence of under-triage (EP disagreement with EMTs for UCC transport).

| Subject # | Age | Gender | Chief Complaint | RR | HR | SBP | DBP |
|-----------|-----|--------|-----------------|----|----|-----|-----|
| 6         | 61  | F      | Altered Mental Status | 16 | 105 | 130 | 70  |
| 13        | 52  | M      | Intoxication     | 18 | 67  | 126 | 85  |
| 18        | 68  | F      | Vomiting         | 18 | 79  | 183 | 90  |
| 21        | 64  | M      | Chest Pain       | 18 | 88  | 117 | 83  |
| 26        | 40  | F      | Hyperglycemia    | 22 | 104 | 128 | 75  |
| 36        | 68  | M      | Spasms           | 18 | 93  | 115 | 93  |
| 42        | 60  | F      | Swollen Finger   | 18 | 71  | 147 | 57  |
### Table 3. Cont.

| Subject # | Age | Gender | Chief Complaint                  | RR  | HR  | SBP  | DBP  |
|-----------|-----|--------|----------------------------------|-----|-----|------|------|
| 47        | 21  | M      | Vomiting/Abdominal Pain          | 14  | 80  | 164  | 72   |
| 62        | 68  | M      | Abnormal Labs                    | 18  | 86  | 120  | 66   |
| 69        | 61  | F      | Abdominal Pain/Vomiting/Diarrhea  | 20  | 64  | 178  | 98   |
| 70        | 51  | M      | Tingling                         | 16  | 78  | 137  | 90   |
| 73        | 55  | F      | Tongue Swelling                  | 16  | 84  | 130  | 88   |
| 79        | 56  | M      | Back Pain                        | 18  | 96  | 149  | 70   |
| 81        | 30  | F      | Abdominal Pain                   | 18  | 91  | 141  | 96   |
| 83        | 70  | M      | Dizziness                        | 18  | 113 | 101  | 69   |
| 111       | 66  | F      | Abdominal pain/Vomiting          | 16  | 73  | 176  | 109  |
| 113       | 90  | F      | Abdominal Pain/Upper Body Pain   | 16  | 74  | 132  | 68   |
| 121       | 48  | F      | Neck Pain/Swelling               | 20  | 75  | 140  | 79   |
| 133       | 54  | M      | Dizziness                        | 16  | 94  | 159  | 85   |
| 134       | 88  | F      | Muscles Soreness                 | 20  | 96  | 140  | 86   |
| 138       | 65  | F      | Shortness of Breath/Dizziness    | 24  | 121 | 145  | 82   |
| 152       | 60  | M      | Alcohol Intoxication             | 18  | 76  | 130  | 77   |
| 174       | 31  | M      | Motor Vehicle Accident           | 18  | 63  | 160  | 87   |
| 182       | 75  | F      | Pain                             | 18  | 74  | 97   | 50   |
| 189       | 68  | M      | Nausea/Dizziness                 | 16  | 88  | 132  | 82   |
| 216       | 70  | F      | Fatigue/Chest Pain               | 18  | 55  | 166  | 67   |
| 223       | 28  | F      | Abdominal Pain/Suicidal          | 16  | 63  | 104  | 73   |
| Mean (x)  |     | 58.07  |                                  |     |     |      |      |

### Table 4. Presence of over-triage (EP disagreement with EMTs for ED transport).

| Subject # | Age | Gender | Chief Complaint                  | RR  | HR  | SBP  | DBP  |
|-----------|-----|--------|----------------------------------|-----|-----|------|------|
| 27        | 44  | F      | Motor Vehicle Accident           | 18  | 92  | 126  | 78   |
| 61        | 23  | F      | Fall                             | 16  | 84  | 94   | 55   |
| 65        | 67  | F      | Abnormal Labs                    | 16  | 60  | 110  | 60   |
| 80        | 79  | M      | Hypoglycemia                     | 18  | 76  | 129  | 64   |
| 105       | 19  | F      | Chest Pain                       | 16  | 85  | 122  | 72   |
| 162       | 73  | M      | Shortness of Breath              | 20  | 112 | 123  | 81   |
| 200       | 65  | M      | Abdominal Pain                   | 16  | 66  | 150  | 103  |
| 217       | 49  | F      | Mental Health Problem            | 18  | 110 | 149  | 104  |
| Mean (x)  |     | 52.38  |                                  |     |     |      |      |

### Table 5. Agreement with UCC transport.

| Subject # | Age | Gender | Chief Complaint                  | RR  | HR  | SBP  | DBP  |
|-----------|-----|--------|----------------------------------|-----|-----|------|------|
| 3         | 34  | F      | Asthma/Shortness of Breath       | 15  | 94  | 131  | 92   |
| 23        | 55  | F      | Leg Swelling                     | 18  | 102 | 129  | 80   |
| 28        | 50  | M      | Ankle Pain                       | 16  | 53  | 142  | 76   |
| 37        | 33  | M      | Alcohol Intoxication             | 16  | 110 | 121  | 83   |
| 43        | 40  | M      | Back Pain                        | 22  | 91  | 153  | 106  |
| 53        | 90  | M      | Back Pain                        | 14  | 68  | 140  | 88   |
| 55        | 55  | M      | Back Pain                        | 16  | 68  | 130  | 74   |
| 64        | 28  | F      | Shortness of Breath              | 19  | 97  | 121  | 79   |
| 89        | 70  | F      | Bilateral Leg Pain               | 16  | 62  | 157  | 67   |
| 117       | 48  | F      | Chest Pain/Shortness of Breath   | 16  | 98  | 138  | 74   |
| 128       | 26  | F      | Shoulder Pain                    | 16  | 78  | 144  | 122  |
| 136       | 29  | M      | Vomiting                         | 18  | 85  | 160  | 108  |
| 139       | 60  | F      | Anxiety                          | 26  | 99  | 176  | 110  |
| 144       | 24  | F      | Vomiting                         | 16  | 98  | 115  | 73   |
| 160       | 60  | M      | Alcohol Intoxication             | 16  | 89  | 118  | 73   |
| 165       | 67  | M      | Shortness of Breath              | 18  | 66  | 133  | 84   |
| 211       | 40  | F      | Back Pain                        | 18  | 99  | 129  | 89   |
| 215       | 63  | F      | Back Pain                        | 18  | 98  | 162  | 102  |
| Mean (x)  |     | 48.11  |                                  |     |     |      |      |
Table 6. Mean (x) differences in age and ED triage vital signs.

|                  | Age  | RR   | HR   | SBP  | DBP  |
|------------------|------|------|------|------|------|
| Agreement for UCC | 48.11| 17.44| 86.39| 138.83| 87.78|
| Under-Triage     | 58.07| 17.85| 83.37| 138.78| 79.52|
| p-value          | 0.0477| 0.2543| 0.3421| 0.9761| 0.1416|

4. Discussion

A primary objective of any EMS system is to ensure delivery of patients to the proper resource using the quickest, most appropriate means of transportation possible. Traditional EMS systems are designed to provide ambulance transport to an emergency department for anyone who calls 911 [13]. As in the ED, triage is an important mechanism in the out-of-hospital arena, and its significance is increasing as EMS systems institute significant operational changes to improve availability and conserve resources [14]. An effective, safe triage process and the ability to access alternative definitive care sites offer meaningful cost containment strategies for EMS [15]. However, although the EMTs and EPs in this study did agree upon a large percentage of cases for appropriate evaluation at either the ED or a UCC, moderate agreement between EMTs and EPs is not acceptable to promote the practice of transporting patients to a UCC instead of an ED. Our key finding is the level of under-triage by EMTs, as described by those cases that the EMTs believed were appropriate for UCC evaluation but inappropriate by the EPs. In this study, even though EMTs and EPs agreed that 198 patients (85%) should be transported to either the ED or a UCC, there were 27 cases (11.6%) in which the EP disagreed with the EMTs decision to transport to a UCC. This is a relatively low, yet still unacceptably high, under-triage rate. This disagreement could lead to delay in care, with potential for a poor outcome by permitting EMS to transport to a lower level of care [4]. EPs also disagreed with eight cases (3.4%) in which EMTs would have opted to transport to the ED instead of a UCC. This type of over-triage may lead to an inefficient allocation of ED resources [16], but over-triage is preferred to prevent harm to the patient by transporting to a facility that provides a higher level of care [17]. In contrast to other studies, both EMTs and EPs agreed that 18 of the 233 (7.7%) cases may not need ED services, which may imply that the public is able to determine when ED services are appropriate.

Further review of the demographic information and ED triage vital signs showed a significant age difference between the patients with disagreement between EMTs and EPs and those with agreement for UCC transport. A lower mean age (< 0.05) was noted in the patients with agreement for UCC transport compared to those for which EPs disagreed with EMTs who opted for UCC transport, which may imply that age is a risk factor for overall morbidity and mortality. Additionally, review of chief complaints suggested that musculoskeletal complaints were most common in the population for which both EMTs and EPs agreed to UCC evaluation. EMTs appeared to prefer ED evaluation for injuries resulting from a significant traumatic mechanism such as a motor vehicle accident and fall, and EPs preferred ED evaluation for gastrointestinal symptoms such as abdominal pain, nausea, vomiting, and diarrhea. These findings may imply that any protocols involving diversion from an ED should include age parameters, chief complaints, and traumatic mechanisms.

UCCs have become ubiquitous in many healthcare markets, yet lack uniformity in the levels of care they provide, and generally will only evaluate insured patients who do not need to pay steep up-front fees [15]. In the local region where this study was conducted, UCCs are staffed with a range of providers including advanced practice nurses (APNs), physician assistants (PAs), non-board eligible/certified physicians, internal medicine physicians, family medicine physicians, and EPs. The range of facility capabilities is broad as well, with some mimicking a traditional office practice, while others offer emergency procedures, lab tests, electrocardiograms, diagnostic radiology, and even intravenous therapy. With additional education to EMS on UCC capabilities and the implementation of protocols, UCCs may provide alternate destinations for EMS during times when EDs are significantly busy and overcrowded, particularly in the setting of disasters or public health emergencies such as a pandemic.
UCCs may provide a more viable option than a primary care office visit or a non-emergent ED visit given their capability to manage more acute presentations without an appointment. However, a “multiple option decision point” (MODP) model of EMS to match patient need to appropriate resources would require rigorous medical direction [4,18], possibly even telephonic and on-site decision-making about the severity of a patient’s illness and disposition to support alternatives to hospital treatment [19]. Many studies have shown that EMS providers may not consistently determine whether a patient requires transport given the only option is to transport to the ED [20], however with the existence of UCCs, EMS providers may be more successful in diverting appropriate patients away from the ED.

Barriers to UCC diversion include patient insurance status, EMS billing practices for non-ED destinations, willingness of patients to be diverted, and the UCCs’ agreement to accept ambulance patients. Many EMS agencies are challenged by traditional economic models that lead to staff challenges and decreasing reimbursement in the setting of increasing call volume. Many agencies are exploring resident subscription models and opportunities to decrease out-of-service (OOS) times. In settings where availability of service in the local area outweighs service reimbursement, transport to the local UCCs might be a viable cost containment strategy to decrease total ED offloading time. Current challenges for EMS and our study results suggest numerous future research opportunities, including implementation of strict UCC transport criteria based on the local area’s UCC capabilities with the goal of reducing discordance between ED and EMS provider triage.

5. Limitations

There are several limitations to this investigation. First, this was a convenience sample of patients who were transported to our ED during the study period. Our sample may not be fully representative of our ED population or other patient populations. This study was also only conducted at one center, and we excluded patients who were immediately cared for by the trauma and obstetrics services. Our exclusion of patients presenting to either service was intentional, as these patients are always considered emergent, requiring immediate evaluation by a specialty service and therefore unlikely to receive appropriate care at a UCC. Another limitation is that the surveys were not simultaneously completed by the EMTs and the EPs. Since patient condition may change from prehospital to ED assessment, the survey answers may differ due to the progression of care or illness. Additionally, while our site’s EPs are familiar with UCC capabilities as many work in UCCs as well, EMS providers may not be as knowledgeable. Finally, variation in UCC provider training (e.g., emergency medicine, family medicine) and different levels of care (e.g., physicians, nurse practitioners, physician assistants) suggests that decision to transport to a UCC will be dependent on individual capabilities and may differ based on local centers.

6. Conclusions

Although there was a high percentage of agreement between EMTs and EPs regarding appropriate transport to a UCC or ED without protocols or medical oversight in place, the number of cases that would have been under-triaged by EMTs for transport to a UCC creates concern that patients may not receive appropriate care on a routine basis. However, during a large-scale event or public health emergency in which ED resources are significantly limited, emergency planners may consider UCCs as an alternative option for EMS transport in the setting of strict protocols with medical direction.

Author Contributions: For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used “conceptualization, G.C. and R.P.; methodology, G.C. and K.L.; formal analysis, R.H.; investigation, G.C. and K.L.; resources, R.H.; data curation, R.P.; writing—original draft preparation, R.H.; writing—review and editing, G.C, K.L, and R.P; visualization, R.P; supervision, R.H.; project administration, G.C.

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References

1. Weaver, M.D.; Moore, C.G.; Patterson, P.D.; Yealy, D.M. Medical necessity in emergency medical services transports. *Am. J. Med. Qual.* 2012, 27, 250–255. [CrossRef] [PubMed]
2. Tohira, H.; Fatovich, D.; Williams, T.A.; Brenner, A.P.; Arendts, G.; Rogers, I.R.; Celenza, A.; Mountain, D.; Cameron, P.; Sprivilus, P. et al. Is it Appropriate for Patients to be Discharged at the Scene by Paramedics? *Prehosp. Emerg. Care.* 2016, 20, 539–549. [CrossRef] [PubMed]
3. Challen, K.; Walter, D. Physiological scoring: An aid to emergency medical services transport decisions? *Prehosp. Disaster Med.* 2010, 25, 320–323. [CrossRef] [PubMed]
4. Gratton, M.C.; Ellison, S.R.; Hunt, J.; Ma, O.J. Prospective determination of medical necessity for ambulance transport by paramedics. *Prehosp. Emerg. Care.* 2003, 7, 466–469. [CrossRef] [PubMed]
5. Silvestri, S.; Rothrock, S.G.; Kennedy, D.; Ladde, J.; Bryant, M.; Pagane, J. Can paramedics accurately identify patients who do not require emergency department care? *Prehosp. Emerg. Care.* 2002, 6, 387–390. [CrossRef] [PubMed]
6. Pitts, S.R.; Carrier, E.R.; Rich, E.C.; Kellermann, A.L. Where Americans get acute care: Increasingly, it’s not at their doctor’s office. *Health Affairs.* 2010, 9, 1620–1629. [CrossRef] [PubMed]
7. Knowles, E.; O’Cathain, A.; Nicholl, J. Patients’ experiences and views of an emergency and urgent care system. *Health Expect.* 2012, 15, 78–86. [CrossRef] [PubMed]
8. Amiel, C.; Williams, B.; Ramzan, F.; Islam, S.; Ladbrooke, T.; Majeed, A.; Gnani, S. Reasons for attending an urban urgent care centre with minor illness: A questionnaire study. *Emerg. Med. J.* 2014, 31, e71–e75. [CrossRef] [PubMed]
9. Coster, J.E.; Turner, J.K.; Bradbury, D.; Cantrell, A. Why do people choose emergency and urgent care services? A rapid review utilizing a systematic literature search and narrative synthesis. *Acad. Emerg. Med.* 2017, 24, 1137–1149. [CrossRef] [PubMed]
10. Yee, T.; Lechner, A.E.; Boukus, E.R. The surge in urgent care centers: Emergency department alternative or costly convenience. *Res. Brief.* 2013, 26, 1–6.
11. America, UCAo. Benchmarking Survey Headlines Summary. *America UCAo.* 2015. Available online: https://c.ymcdn.com/sites/ucaoa.site-ym.com/resource/resmgr/Benchmarking/UCAOA-BenchmarkSurvey_Infogr.pdf (accessed on 1 July 2018).
12. Merritt, B.; Naamon, E.; Morris, S.A. The influence of an urgent care center on the frequency of ED visits in an urban hospital setting. *Am. J. Emerg. Med.* 2000, 18, 123–125. [CrossRef]
13. Schmidt, T.; Atcheson, R.; Federiuk, C.; Mann, N.C.; Pinney, T.; Fuller, D.; Colbry, K. Evaluation of protocols allowing emergency medical technicians to determine need for treatment and transport. *Acad. Emerg. Med.* 2000, 7, 663–669. [CrossRef] [PubMed]
14. Pointer, J.E.; Levitt, M.A.; Young, J.C.; Promes, S.B.; Messana, B.J.; Ader, M.E. Can paramedics using guidelines accurately triage patients? *Ann. Emerg. Med.* 2001, 38, 268–277. [CrossRef] [PubMed]
15. Asplin, B.R. Undertriage, overtriage, or no triage? In search of the unnecessary emergency department visit. *Ann. Emerg. Med.* 2001, 38, 282–285. [CrossRef] [PubMed]
16. Ersoy, N.; Ashhan, A. Triage decisions of emergency physicians in Kocaeli and the principle of justice. *Ulus. Travma. Acil. Cerrahi. Derg.* 2010, 16, 203–209.
17. Kilner, T. Triage decisions of prehospital emergency health care providers, using a multiple casualty scenario paper exercise. *Emerg. Med. J.* 2002, 19, 348–353. [CrossRef]
18. Neely, K.W.; Drake, M.E.; Moorhead, J.C.; Schmidt, T.A.; Skeen, D.T.; Wilson, E.A. Multiple options and unique pathways: A new direction for EMS? *Ann. Emerg. Med.* 1997, 30, 797–799. [CrossRef]
19. Neely, K.W.; Eldurkar, J.A.; Drake, M.E. Does emergency medical services dispatch nature and severity codes agree with paramedic field findings? *Acad. Emerg. Med.* 2000, 7, 174–180. [CrossRef]
20. Neely, K. Demand management: The new view of EMS? *Prehosp. Emerg. Care.* 1997, 1, 114–118. [CrossRef] [PubMed]