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Different Types of Triage
Triyaj Türleri

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ABSTRACT
Emergency departments of hospitals are one of the most important components of the health care system. There is an increase in numbers of patients visiting emergency departments leading to overcrowding, long waiting time and negative impact on patient satisfaction. Several studies have demonstrated that more than half of emergency department visits are for non-urgent reasons, leading to unnecessary costs and many adverse consequences. There are several aspects of emergency department triage which are used to identifty priority of treatment, available resources and time. The aim of this article is to describe different types of triages.
Key words: Triage, emergency department.

ÖZET
Hastanelerde acil servisler sağlık sisteminin en önemli bileşenlerinden biridir. Acil servisleri ziyaret eden hasta sayısında artış, kalabalığa, uzun bekleme süresi ve hasta memnuniyeti üzerine olumsuz etkilere neden olmaktadır. Farklı çalışmalar, acil servis ziyaretlerinin yarısından fazlasının acil olmayan nedenlerle olduğu; bu durumun da gereksiz maliyetlere ve olumsuz sonuçlara neden olduğunu göstermiştir. Tedavi önceliği, mevcut kaynaklar ve zaman acil servis triyajının önemli ölçütlerindendir. Bu yazıda çeşitli türlerdeki triyajların tanımlanması hedeflenmiştir.
Anahtar kelimeler: Triyaj, acil servis.

Introduction

Triage is a fundamental function in emergency departments (EDs), where many patients may present at the same time. The aim of triage system is to be sure that the patients will be treated according to their clinical urgency, which refers to the need for time-critical

intervention. Also, triage helps in directing the patient to the most suitable area for assessment and treatment, and collects data that helps to describe the case-mix in the departmental. Changing patterns of care in some EDs do not eliminate the need for triage[1].

Triage is a system used in emergency when the number of injured needing care exceeds the resources available to perform care so as to treat the greatest number of patient possible. Triage has evolved to become a critically important part of the ED, as long waits to see the ED physician /nurse require prompt identification at triage of those patients with high-risk conditions. The patients arriving at ED usually face long waiting times. Although EDs always use some sort of triage, either formal or informal, overcrowding of EDs makes accurate triaging import to avoid delays in critical patient care, which might result in waiting long times and bad outcomes[2]. ED triage systems helps in categorizing of emergency patients according to the disease severity and decide both priority and location of treatment. The target of every triage systems is to minimize the in-hospital mortality and to decrease time to treatment, length of stay, and the used resources[3].

Five-level triage systems are more effective and useful than other systems; they are the systems of choice [4]. Four various five-level triage systems are accepted internationally which are Australasian Triage Scale (ATS), Manchester Triage System (MTS), Canadian Triage and Acuity Scale (CTAS) and Emergency Severity Index (ESI)[4,5]. Triage is the procedure of sorting patients in light of the level of sharpness to guarantee the most extremely harmed and sick patients get convenient consideration before their condition declines[6]. Generally, clinicians are all around prepared in history taking and physical examinations which are utilized to make an analysis[6,7]. Conventions in pocket handbooks have been intended to guarantee that crises are fittingly handled. This is especially applicable in mishap and crisis offices where patients with basic wounds frequently require timeous consideration regarding avert avoidable weakening of their condition[7]. Deferred or poor activity in light of watched irregular physiological parameters can prompt avoidable and startling deaths[7]. Identifying patients at danger of crumbling at an early stage by method for basic rules taking into account physiological parameters can diminish the quantity of revival methodology required in crisis rooms[7]. This can conceivably enhance the hole between problematic consideration and great consideration, bringing about better results[8].

The sudden decay of a patient' condition in doctor's facility is frequently gone before by

reported confirmation of changes in physiological parameters[8]. Delays in perceiving the decay of respiratory or cerebral capacities utilizing basic physiological perceptions expand the danger of cardiopulmonary arrest[7,8]. Without auspicious and proper intercession, neighborhood incendiary procedures break down and in the end get to be generalized[9]. The essential point of triage is to recognize each one of those patients whose condition is required to compound ought to quick care not be gotten[10]. The auxiliary point is to distinguish each one of those patients who don't require time basic consideration, can be securely triaged into a non-earnest class. These patients would need to sit tight for a couple of hours or be alluded to another social insurance supplier[10]. The aim of this artcile is to describe different types of triages.

Definition of Triage

Triage is defined as" a dynamic decision-making process that prioritizes the patient's need for medical care when arrive EDs"[12]. Oxford English Dictionary has defined triage as 'The assignment of degrees of urgency to illnesses or wounds in order to decide the order of treatment'[13]. Now, it is defined as the process of sorting and categorization of patients according to the degree of severity of condition, and the availability of medical and transport facilities[14]. The purpose of triage is to give prompt care and adequate treatment to all patients arriving to the ED.

Historical Origin of Triage

The word triage was derived from the French verb (trier) which mean to pick or to sort[15]. This word entered English as a noun describing the process of sorting agricultural products[16]. Triage was first developed in battlefield in the 18th century by Baron Dominique Jean Larrey, Chief Surgeon of Napoleon's Imperial Guard[17]. Larrey set a clear rule for sorting patients for treatment which was to treat those who are dangerously wounded first without regard to rank or distinction then those who are injured in a less degree may wait until those who are badly mutilated have been operated on and dressed[18]. In 1846 the British surgeon John Wilson said that surgeons should focus on those patients who need immediate treatment and those whose treatment is likely to be successful, postponing treatment for those whose wounds are probably fatal with or without immediate intervention and those whose wounds are less severe[19].

In 1963 a system called "medical triage" was instituted in Yale-New Haven Hospital which was an initial screening technic intended to provide brief medical evaluation of incoming patients, to determine type and priority of service required, and to accomplish appropriate referral[20]. Since the early 1990s, many countries have developed and introduced ED triage[21]. Development of triage scales in several countries has been influenced greatly by the seminal work of Fitzgerald leading to development of 5-level scales triage in the 1990s and 2000s[22].

Principles of Triage

The triage principle of prioritizing care to large groups of people has been adapted from its military origin for use in the civilian context of initial emergency department care[11]. Triage is the formal process of immediate assessment of all patients who present to the ED. It is an essential function in the ED as many patients may present simultaneously. An effective triage system aims to ensure that patients seeking emergency care "receive appropriate attention, in a suitable location, with the requisite degree of urgency" and that emergency care is initiated in response to clinical need rather than order of arrival. Triage aims to promote the safety of patients by ensuring that timing of care and resource allocation is requisite to the degree of illness or injury. An effective triage system classifies patients into groups according to acuity of illness or injury and aims to ensure that the patients with life threatening illness or injury receive immediate intervention and greatest resource allocation In Australia, triage is predominantly a nursing assessment that begins when the patient presents to the ED. Triage is the point at which emergency care begins. Triage is an ongoing process involving continuous assessment and reassessment[11].

Types of Triage

There are several types of triage including disaster triage, military triage, ED triage, ICU triage and telephone triage[23]. There are several differences between ED triage and Disaster triage. In ED triage, each patient is assessed according to this patient clinical needs, while categorization of patients in disaster triage depends also on the limited resources and the other casualties. EDs triage usually uses 5 level scale while, disaster triage usually uses 3 or 4 level scales[25].

Triaging of patients has the accompanying objectives:

1. To distinguish patients with critical life debilitating conditions.

2. To decide the most reasonable treatment regions for those patients touching base in the ED.
3. To diminish clog and congestion in crisis territories[24].

The goals of the triage framework are the accompanying:

1. To diminish the general length of stay and to decline sitting tight times for Red and orange patients.
2. The triage framework enhances patient and wellbeing supplier fulfillment, progresses tolerant stream and reductions stuffing inside the crisis ranges. It empowers the conveyance of time-basic treatment forever debilitating conditions and in conclusion guarantees exact arrangement of patients[8].

Triage Tag

Triage tag is a tool first responders and medical personnel use during a mass casualty incident? as Figure 1. Patients generally are tagged. Tags are color-coded as follows[8].

Colour	Priority	Description
Red	1	May survive if given immediate simple life saving measures
Yellow	2	Should survive if given care within a few hours
Green	3	Walking wounded: minor injuries that do not require rapid care
Black	4	Deceased or severely injured patients unlikely to survive

Figure 1. Categories of triage tag

Advanced Triage

1. Blue/Expectant: To die
2. Red/Immediate: Immediate surgery or other-life saving intervention transport to advanced facilities.
3. Green/Wait: Not immediately, may wait for a number of hours or be told to go home and come back the next day (broken bones without compound fractures, many soft tissue injuries).
4. Yellow observation: Stable for the moment but requires watching by trained persons and frequent re-triage, will need hospital care (and would receive immediate priority care

under note immediately, may wait for a number of hours or be told to go home and came back the next day (broken bones without compound and fractures , many soft tissues injuries)[23].

5. White/Dismiss: They have minor injuries, first aid and home care are sufficient, a doctor's care is not required

Benefits of triage tags are to improve traffic flow and increase distributed care among injured patients during data collection. Also information can be obtained and added on to the triage tag throughout the triage and it helps to assess patients or victims condition where the priority can go up or down .This eliminates the need to re-triage[25].

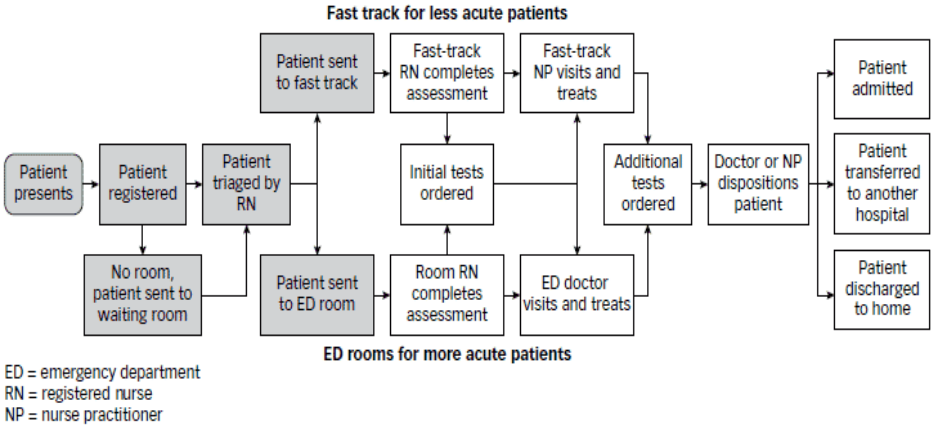

Figure 2. Emergency department –new patient flow.

ED Triage

The hospital ED is one of the most important components of the health care system[5].There is an increase in numbers of patients visiting EDs leading to overcrowding, long waiting time and negative impact on patient satisfaction[23]. Several studies have demonstrated that more than half of ED visits are for non-urgent reasons, leading to unnecessary costs and many adverse consequences[24]. As a result, EDs developed triage systems to ensure that patients who had the most urgent medical problems and need immediate care were actually treated first

and that others could safely wait as showing in figure 2 [30].There are several aspects of ED triage which are priority of treatment, available resources and time. In the previous concept we can identify ED triage as a dynamic process of rapidly and systematically categorizing the patient according to severity of illness or injury, priority for treatment and efficiently use ED resources[25].

Implantation of ED triage

There was an increase in number of patients presenting to the EDs in the United States in the 1960's as a result to Healthcare reform, this led to implantation of ED triage systems to ensure that the patient who need immediate treatment treated first[25]. Also, in 1970's in Australia there was an increase in patients' number who presented to the ED by ambulance, which resulted in the development of several local 5 level triage systems. These triage systems were the basis of the ATS which was implemented in 1993[23]. Nowadays, several European countries (Portugal, the Netherlands and Switzerland) have implemented one of the previous triage scales[26].But in Egypt there is no available ideal triage except in little especial hospital so we hope to generalized to all hospitals.

The main objective of triage is immediate patient assessment to avoid any possible harmful delay. Triage aims to ensure that timing of care and resource allocation is according to the degree of illness or injury[27]. The benefits of triage are reduction in waiting time especially for those in need of the most urgent attention and reduction in levels of anxiety in patients, or in those accompanying them, as they are reassured that their condition either urgent and will receive immediate attention, or that the situation is under control clinically and can wait with no harmful result[27].

ED Triage Scales

The ideal triage scale must be easy to understand, simple to use, have high inter-rater agreement, facilitate appropriate location of patients, predict ED resource use requirements and predict clinical Outcome. Also, it should be applicable across all patient populations and age groups, allow for quick rating of patients and rapid identification of patients in need of immediate care[28]. An effective triage scale should increase the quality of patient care, shorten patients' length of stay and waiting time by optimizing time of medical assessment and intervention. It should also have high validity through measuring clinical urgency as opposed

to severity or complexity of illness[28].

Different triage scales have been developed to classify ED patients to achieve acceptable health outcomes. Triage scales usually have 3 to 5 levels supported by triage guidelines and procedures[29]. The 1st five-level scale was the Ipswich Triage scale from which all others have been adapted. The National Triage Scale (NTS) which then became the Australasian Triage scale (ATS), the Manchester Triage Scale (MTS), the Canadian Emergency Department Triage and Acuity Scale (CTAS) and the Emergency Severity Index (ESI) have had the greatest impact on modern ED triage. Other scales as the Soterion Rapid Triage Scale (SRTS) and the 4-level Taiwan Triage System (TTS) have not distribute as widely around the globe[22]. Internationally, five levels triage scales show a greater degree of validity, precision and reliability when compared either three or four level triage systems[29].

The South African Triage Scale (SATS)

In 2004, the South African Triage Group (SATG) (some time ago known as the Cape Triage Group) was gathered under the sponsorship of the joint Division of Emergency Medicine at the Universities of Cape Town and Stellenbosch. The point of the SATG was to create a triage scale for use all through South Africa[43]. The gathering was multi-disciplinary and contained specialists, medical caretakers and paramedics. The aftereffect of the SATG's exercises is the South African Triage Scale (SATS), a physiology and manifestation based scale which organizes into one of four hues and can be utilized as a part of clinic, Emergency Centers and additionally in the pre-doctor's facility setting. The SATS has been approved in general society, private medicinal services setting and also pre-healing facility[43].

The SATS has appeared to decrease mortality and bleakness, is effortlessly educated and caught on, is viable and easy to understand and is solid and exact. The advantages of the SATS [44] are to speed up the conveyance of time-basic treatment for patients with life-undermining conditions, to guarantee that all individuals requiring crisis consideration are properly ordered by clinical condition, to enhance quiet stream to enhance quiet fulfillment, to abatement the patient's general length of remain, to encourage spilling of less pressing patients and is its easy to use though levels of wellbeing couldn't care fewer experts.

SATS was produced out of a requirement for a precise and target measure of desperation in light of physiological parameters and clinical discriminators that is effectively executed in low

asset settings[43].

The Cape Triage Score (CTS)

The Cape Triage Score (CTS) has been inferred by the Cape Triage Group (CTG) for use in crisis units all through South Africa. It can likewise be utilized as a part of the pre-clinic setting , despite the fact that it is not intended for mass setback circumstances[44]. The CTS involve a physiologically based scoring framework and a rundown of discriminators, intended to triage patients into one of five needs bunches for medicinal consideration. Three variants have been created, for grown-ups, youngsters and newborn children[43]. The need to organize the consideration of Egyptian patients in both the pre-clinic and emergency unit (EU) setting is self-evident. Such prioritization is termed triage – the procedure of sorting patients as per therapeutic need. As there is no broadly acknowledged triage framework in Egypt, the need to plan and actualize such a framework was recognized. Numerous universal triage frameworks exist, however none of these frameworks are suitable for use in Egypt. In-doctor's facility triage frameworks incorporate the Manchester Triage, The Canadian Triage Assessment Scale (CTAS)[21] and the Australian Triage Score (ATS)[43].

Implementation of each of these triage tools requires extensive training, making their widespread adoption in Egypt problematic[20]. Moreover, the time taken to triage every patient surpasses necessities for the Egyptian setting, where persistent numbers are more noteworthy and the pathology frequently more progressed[43].

Pre-healing center triage apparatuses are regular to a wide range of nations; in any case, they do not have the affectability and specificity to make them alright for crisis unit use besides, some are accepted just for injury triage, 3-6.while others are excessively point by point, making it impossible to be of roadside use[43]. Precise pre-healing center triage is crucial for suitable use of assets, exact notice of getting doctor's facilities, quality administration and review of the emergency vehicle administration[43]. Nonappearance of a triage framework prompts delayed holding up times ,poor administration of clinical hazard and expanded dismalness and mortality. With a specific end goal to augment the effective utilization of assets what's more, to minimize danger to the patient, a powerful triage frame work with high affectability and specificity is required[44]. Without objective clinical parameters, varieties in patient appraisal are unavoidable. The expressions "stable" and "unstable" neglect to mirror the patient's clinical condition precisely[43]. The CTG set objectives that included

characterizing imperative sign parameters, while guaranteeing that the triage framework remained easy to understand keeping in mind the end goal to empower fast and exact sorting of crisis patients[43].

The shading classifications are as per the following:[21.]

1. red – prompt need revival cases)
2. Orange – extremely pressing need conceivably life/appendage debilitating pathology);
3. yellow-critical need (huge pathology);
4. Green – postponed need (minor wounds/sickness);
5. Blue – dead.

The orange class diminishes the quantity of patients in the possibly substantial yellow class while constraining the red class to revival cases. For effortlessness, the orange class won't be utilized as a part of the pre-clinic setting. The CTS inference process has been through both master supposition and in-healing center forthcoming studies. Three versions have been adapted. The adult version is intended for those over 12 years of age or 150 cm in height, the child version has been developed for those 95-150 cm or 3-12 years old, and the infant version for those under 95 cm or less than 3years of age[43,44].

Australasian Triage Scale (ATS)

ATS is a 5 point scale that is used throughout Australia and New Zealand to sort patients by clinical urgency. Also, it was the starting point for the development of MTS in United Kingdom and CTAS in Canada. ATS standardized approach to triage has been shown to facilitate access to emergency care services based on urgency and regardless of patient demographics[45].

History

ATS was formally called NTS (National Triage Scale) which was implemented in 1993 as the 1st triage system used in all publicly funded EDs in Australia. ATS was formulated in 2000 as a result of revision of NTS and the main difference was the description of each categories[25].

Categories of ATS

After application of ATS in Australia there were varying degrees of consistency which led to publication of The Consistency of Triage in Victoria's Emergency Departments Project which aimed to improve the consistency of triage through development of physiological

discriminators that would allow for the use of objective and subjective data in the triage decision-making process[45].

ATS consist of five categories which link patient history, signs and diagnosis to clinical urgency[45]. LeVasseur and others described each category of ATS in indicative manner as shown in Table 1[33]. Also, we should consider presence of risk factor for serious injury or illness as Presence of one or more risk factors may result in allocation of the patient to a higher level of acuity.

These risk factors include:

1. Patient age > 65
2. Presence of co morbidities as cardiovascular, respiratory or renal disease, D.M, cancer or immune-compromised patient
3. Patient with cardiac risk factors as obesity, smoking or high cholesterol
4. History of collapse, seizure or apneic episodes.
5. Mechanism of injury in trauma patients as length of the fall > 5m or presence of penetrating injury.
6. Patients with high risk alerts as history of violence or sexual assault.
7. Other factors as rash which may be due to anaphylactic reaction or change in body temp.

Emergency Severity Index (ESI)

ESI is 5 level triage scale and it is mainly in use in the USA. ESI has shown marked improvement in reliability and validity over traditional triage systems. Also, it demonstrated excellent inter-rater reliability and validity at predicting resource utilization, LOS and six-month mortality[41].

History

ESI was developed by Wuerz et al. due to poor reliability and validity of the 3 level triage scale that was in use in USA. The concept of this triage was asking about not only who needs to be seen first, like other 5 level triage scales, but also asking about what does that patient need?[41]. In 1999, version 1 of ESI was implanted in two university based EDs. In 2000, ESI version 1 was revised and developed to version 2 that included pediatric criteria and other changes like heart rate, which become over 100 beats/min[42]. In version 2, it was required to up-triage a patient in level 3 to level 2 if violated that danger vital zone so version 3 was developed to

consider up-triage and not be required to up-triage in all cases[42].

Table 1. Description of ATS categories

ATS categories	Response	Description of Category	Clinical Descriptors (indicative only)
ATS 1	Immediate simultaneous assessment and treatment	Immediately Life-Threatening	Cardiac arrest Respiratory arrest Respiratory rate <10/min BP< 80 (adult) Unresponsive or (GCS < 9) Uncontrolled hemorrhage or hypoventilation
ATS 2	Assessment and treatment within 10 minutes (assessment and treatment often simultaneous)	Important time-critical treatment or Very severe pain	Moderate respiratory distress Circulatory compromise -Hypotension with hemodynamic effects -Severe blood loss severe pain , (GCS< 13(Major multi trauma, severe localized trauma – major fracture, amputation High-risk history
ATS 3	Assessment and treatment start within 30 mins	Potentially Life-Threatening or Situational Urgency	Severe hypertension Moderately severe blood loss Moderate shortness of breath Head injury with short LOC Moderate pain Moderate limb injury, deformity, severe laceration
ATS 4	Assessment and treatment start within 60 minutes	Potentially serious or Situational Urgency or Significant Severity	Normal vital signs, Chest injury without rib pain or respiratory distress Minor head injury, no LOC Minor limb trauma low/moderate pain
ATS 5	Assessment and treatment start within 120 minutes	Less Urgent or Clinico-administrative problems	Minimal pain Minor symptoms of existing stable illness Minor wounds Immunization only

Later ESI version 4 was developed but due to some limitation in ESI level 1 and 2 criteria in version 3. In version 4 ESI level 1 criteria expanded to include those ESI level 2 who needs immediate intervention to prevent further deterioration[42]**.** In 2009, the American Hospital Association reported that in USA 57% of the hospitals used ESI, 25% used 3-level, 10% used 4-level, 6% used other 5-level systems, 1% used 2-level and 1% did not use any triage systems[42].

Categories of ESI

ESI is 5 level triage system using a flowchart-based triage algorithm. It does not define waiting time to be seen by a physician. It use both patient acuity and expected resource needs to categorize patients from level 1 to level 5 and this is a unique feature of this system[30].

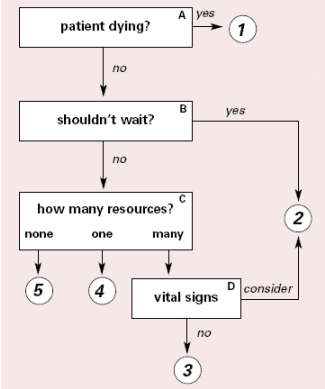

Figure 3. ESI (v.4) conceptual algorithm

ESI consists of five categories, at first we assess the acuity level only to determine levels 1 and 2 then we determine the number of resources needed to determine levels 3, 4 and 5. Gilboy et al. described the concept of the ESI algorithm as shown in Figure (3) [11].This algorithm uses four decision points (A, B, C, and D) to sort patients into one of the five triage levels. The four decision points uses 4 key questions which are:

A. Does that patient require immediate life-saving intervention?
B. Should not wait?
C. How many resources will be needed?
D. What are his vital signs?

The answer of these questions guide the user to the right triage decision as shown in Figure 4[11].

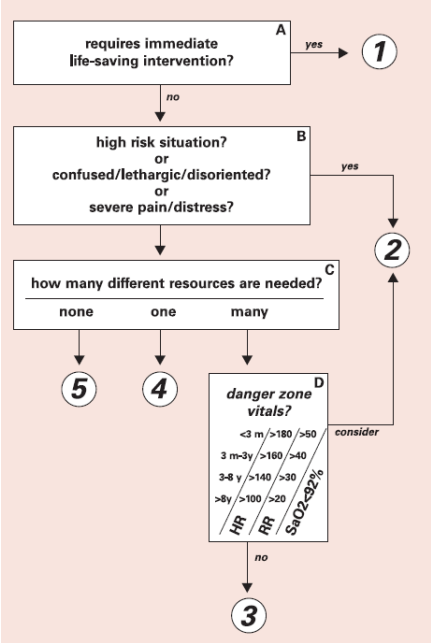

Figure 4. ESI triage algorithm

A. Immediate life-saving intervention required: This stage represents ESI level 1 as patients are seen immediately because timeliness of interventions can affect morbidity and mortality. Some examples of life-saving and not life-saving interventions are described in Table 2: [11].Also, we must assess the patient's level of responsiveness to identify the patient who has a recent or sudden change in level of conscience and requires immediate intervention by using the AVPU (alert, verbal, pain, unresponsive) scale as shown in Table 3. Patient that score a P (pain) or U (unresponsive) on the AVPU scale meets ESI level-1 criteria.

B- Should not wait?: There are three condition in which the patient cannot wait as if the patient in high-risk situation and require time-sensitive treatment or his condition will deteriorate rapidly or has a potential threat to life, organ or limb. The 2nd condition is when the patient is confused, disoriented or lethargic and this refers to acute alternation in LOC,

which indicates that the brain may be compromised. the 3rd one is when the patient in severe pain or distress and this can determined by clinical observation or patient rating of pain greater than or equal to 7 on 0-10 pain scale. These three conditions will make the patient in ESI level2 [30].

Table 2. Immediate Life-saving and not life-saving interventions

	Life-saving	**Not life-saving**
Airway/breathing	Intubation Surgical airway Emergent CPAP Emergent BiPAP	Oxygen administration Nasal cannula Non-rebreather
Electrical Therapy	Defibrillation Emergent cardioversion External pacing	Cardiac Monitor
Procedures	Chest needle decompression Pericardiocentesis Open thoracotomy Intraosseous access	Diagnostic tests ECG Labs Ultrasound
Hemodynamics	Significant IV fluid resuscitation Blood administration Control of major bleeding	IV access Saline lock for medications
Medications	Atropine Dopamine naloxone	Heparin Pain medication IV nitroglycerin

Table 3. Four levels of the AVPU Scale

AVPU level	**Level of consciousness**
A	Alert: The patient is alert, awake and responds to voice. The patient is oriented to time, place and person. The triage nurse is able to obtain subjective Information.
V	Verbal: The patient responds to verbal stimuli by opening their eyes when someone speaks to them. The patient is not fully oriented to time, place, or person.
P	Painful: The patient does not respond to voice, but does respond to a painful stimulus, such as a squeeze to the hand or sternal rub. A noxious stimulus is needed to elicit a response.
U	Unresponsive: The patient is nonverbal and does not respond even when a painful stimulus is applied

C- How many resources will be needed? Resource prediction used only on less acute patients in ESI levels 3 to 5 as following:

If no resources needed then it is *ESI level 5*
If one resource needed then it is *ESI level 4*
If two or more resources needed then it is *ESI level 3*, and in this case we will move to the next question.

We count the number of different types of resources, not the individual tests or x-rays (examples: CBC and electrolytes equals one resource; CBC plus chest x-ray equals two resources).Examples of resource and not resource are demonstrated in table 4 [11].

Table 4. ESI resources and not resources

Resources	Not Resources
Labs (blood, urine) ECG, X-rays CT-MRI-ultrasound angiography	History & physical (including pelvic) Point-of-care testing
IV fluids (hydration)	Saline or heplock
IV or IM or nebulized medications	PO medications Tetanus immunization Prescription refills
Specialty consultation	Phone call to PCP
Simple procedure =1 (lac repair, Foley cath) Complex procedure =2 (conscious sedation)	Simple wound care (dressings, recheck) Crutches, splints, slings

D-What are his vital signs? If the patient categorized as ESI level 3, we should asses his vital signs which include HR, RR and O2 saturation. If the patient exceeded limits of vital signs danger zone, we should consider up-triage this patient to ESI level 2. This decision depends also on objective assessment of the patient, pain level, past medical history, current medication, age, gender and clinical judgment and knowledge of the person who do the triage. Danger vital zone criteria in adult patients could bedefined as HR > 100, RR > 20, SaO2 < 92% 11.

Triage Decisions

Triage decisions are complex clinical decisions often made under conditions of uncertainty

with limited or obscure information, minimal time and with little margin for error. Triage nurses must also be able to discriminate useful cues from large amounts of information in order to perform triage safely. It is the responsibility of the triage nurse to rapidly identify and respond to actual life-threatening states and to also make a judgement as to the potential for life- threatening states to occur. Triage decisions are made in response to the patient's presenting signs or symptoms and no attempt to formulate a medical diagnosis is made. The allocation of a triage category is made on the basis of necessity for time-critical intervention to improve patient outcome, potential threat to life or need to relieve suffering. The decisions made by a triage nurse are a pivotal factor in the initiation of emergency care. Therefore the accuracy of triage decisions is a major influence on the health outcomes of patients. As all of these characteristics make triage decision-making inherently difficult, it may be argued that triage nurses require advanced clinical decision making expertise. Triage decisions can be divided into primary and secondary triage decisions. Primary triage decisions relate to the triage assessment, allocation of a triage category and patient deposition whilst secondary triage decisions relate to the initiation of nursing interventions in order to expedite emergency care and promote patient comfort[31].

Telephone Triage

The recognition of the need for formalized telephone triage and its development first occurred in the United States. Telephone triage was first described as a useful tool in the emergency setting in the United Kingdom in 1991. Various benefits have been attributed to this strategy including reduced attendance at the ED due to explanations and self-care advice, redirection of patients to more appropriate agencies, identification of problems before the patient attends the department, cost effectiveness and patient empowerment. Giving advice by telephone has always been an integral part of the nurse's role although none has been recognised as having a particularly distinct identity[32].

Early studies suggested that patient assessment by telephone was subjective, poorly structured and carried out by untrained personnel. Decisions were made hastily without ascertaining the full facts. Recommendations arising from these studies were that a designated telephone advisor be the first point of contact for telephone advice, protocols for informed advice for common problems should be developed and that adequate documentation was essential. Where these strategies have been implemented in practice,

telephone triage has been found to be a safe and effective method of prioritisation. Formalized advice giving by telephone has the potential to be a valuable tool in many settings–a fact that has been recognized in the development of NHS Direct, the telephone advice and help line, in the United Kingdom. The demarcation line between telephone advice and telephone triage is debatable. It is suggested that triage occurs when a formalized process of decision making takes place which allows identification of clinical priority and allocation to predetermined categories of urgency of need for medical evaluation and care[32].

Telephone Triage Methodology

When undertaken effectively, triage involves a decision about clinical priority, which is based on presentation rather than diagnosis. Telephone triage should be undertaken in exactly the same way. The methodology described here builds on the effective face-to-face triage methodology taught by the Manchester Triage Group. The possible outcomes are, however, simplified from the five category system as there are fewer options available to the telephone triage practitioner.

The decisions which must be made are as follows:

1. _Does the patient need immediate and urgent care? (Medicine now)
2. _ Do they need care within the next few hours? (Medicine soon)
3. _ Can medical or other care be delayed? (Medicine later)

Patients who are in the medicine now category are best served by the emergency[33] ambulance service and emergency departments, whatever their locations. Those in the other two categories may have care delivered in a number of locations and by various providers. Thus the time to care in the Medicine Soon category will vary, depending upon the setting in which the telephone triage is located. In ED based triage this might mean that the patients should make their way to the ED as soon as possible. In primary care based triage, the patient might be seen the same day in the nearest available clinic. It is essential that the practitioner undertaking telephone triage is aware of (or has access to information about) current local service organisations such as dental emergency arrangements, telephone numbers of primary care facilities and the location of all night pharmacies[34].

Making Decision

On receiving the telephone call, the practitioner must gather some basic information from the

caller about the nature of the problem. This will dictate which presentational flow chart is selected. Once the decision has been made, questioning techniques are used to elicit information in order to decide what priority should be allocated. The methodology is reductive – working from more serious to less serious discriminators, and the nurse is prompted to cover all possibilities by the information contained on the flow charts[35]. The practitioner must decide whether the criteria for each discriminator are fulfilled, and which of the discriminators present leads to the highest clinical priority. An example chart for back pain is shown above. Discriminator definitions remain the same when undertaking triage by telephone. The questions normally asked by the triage practitioner must be modified to take into account the remoteness of the patient, the levels of anxiety and the possibility that the caller is not the patient[35].

Telephone Triage Practitioner

Telephone triage, like face-to-face triage, should be undertaken by experienced practitioners. The availability of protocols and charts does not remove the need for expert clinical knowledge. Arguably the decisions made in telephone triage call for a higher level of skill and knowledge than when the patient is present. Furthermore the questioning skills of the practitioner must be very highly developed in order to obtain the most useful information from a troubled caller in the least possible time[36].

Like face-to-face triage, telephone triage works well when it is carried out correctly and less well when corners are cut, or important aspects such as pain are ignored. Systems must be auditable and this relies on good training of competent practitioners using their skills and knowledge and the tools available to them to the best effect. The telephone triage methodology provides an effective and auditable tool for the prioritisation of patients presenting to immediate care settings by telephone[36].

Triage Methods

Triage methods used for the assessment of a single casualty are not necessarily applicable to the assessment of many casualties. In the assessment of a single patient, sufficient time may be available for a relatively detailed clinical history and physical examination. If many casualties require rapid assessment then methods of triage which take time or require special equipment are of little value, as the time taken to assess a single casualty may delay and

prejudice the care of other victims. The principal solution to this problem has been the development of objective triage scores. Few UK pre-hospital care services routinely use any form of formalized triage score at the present time. Major incident triage in the UK will therefore usually be performed by personnel who may never have performed formal triage before. An objective, simple and quick method of assigning priorities is required[37].

Objective methods have the advantage that they are reproducible, require little in the way of clinical skills or experience, and can be quickly and reliably taught to personnel with minimal medical training. For experienced clinicians any additional information may be used in conjunction with an objective scoring system to reach a final triage categorization.

If a triage scoring system is to be of use in major incidents then it must be quick, reproducible, easy to use (in the environment in which it is to be used), should be able to describe major incident outcomes, dynamic. Of the many methods in use for a small number of casualties, the TRTS is the only score that satisfies such criteria. The score has been further modified by the Advanced Life Support Group for use within the environment of a major incident. The resulting method, the triage sieve/triage sort system, is described below[13] (Figure 5).

In the initial stages of a major incident a large number of triage decisions need to be made quickly. Typically this is at the scene of the incident itself but rapid triage may be needed at the Casualty Clearing Station, or at the hospital reception. The method used to triage the casualties must be fast, easy, safe and must give the same result whoever carries it out. Since the accuracy of any method depends upon the amount of information used to reach a decision and gathering information takes time, there is a trade-off between speed and accuracy. All patients will be retriaged and any necessary refinements can then be made[38].

The aim of the triage sieve is to convert the chaos of a large number of injured casualties into some sort of medical order. Since the greatest number of patients are likely to have minor injuries, the most effective first step in establishing order is the separation of the priority 3 (delayed) patients from the rest. At this stage it is reasonable to assume that patients who can walk do not require urgent or immediate treatment, and all such patients are therefore categorized as priority 3 (delayed). Once this has been done the state of the airway, breathing and circulation is considered those patients who remain after the mobility sieve has been applied must be either priority 1 (immediate), priority 2 (urgent) or dead. They are sorted into

the appropriate category by looking at simply assessed aspects of airway, breathing and circulation[39].

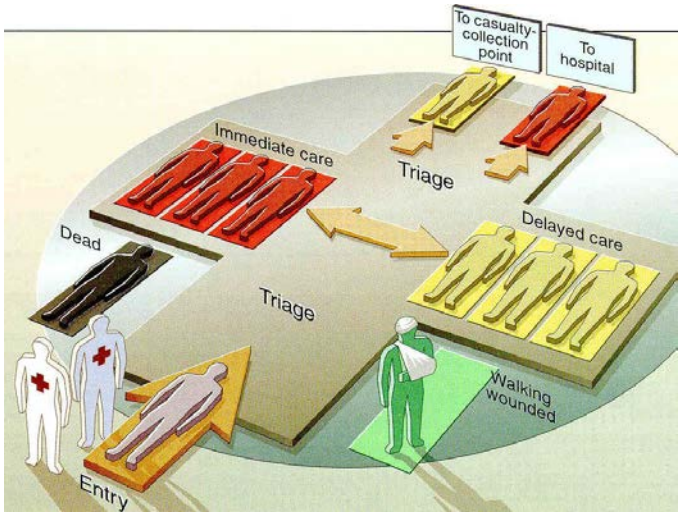

Figure 5. Triage sieve

Airway patency (not security) is assumed in conscious patients and is assessed in the unconscious by performing a simple opening manoeuvre (chin lift or jaw thrust) and seeing if breathing occurs. Casualties who cannot breathe despite simple opening manoeuvers are dead. Patients who only breathe after their airway is cleared are priority 1(immediate). Some patients may need a simple airway adjunct to maintain airway patency and this can be inserted at this stage. Those who can breathe have their respiratory rate counted. If the rate is low (9 or less, 30 or more) then the casualty is priority 1 (immediate). If the rate is 10–29 breaths per minute then an assessment of the circulation is carried out. An assessment of circulation is difficult even within the hospital, and no single measure will reliably give an accurate overall picture. Despite this reservation the capillary refill time fulfils other criteria in that it can be measured simply and quickly in the nail bed. Pressure is applied over the quick of the nail for 5 seconds and then released—the time taken for the colour to return is the refill time. If this time is over 2 seconds then the patient is assigned priority 1 (immediate), and if it is 2 seconds or less then the casualty is priority 2 (urgent). If it is not possible to measure CRT then a pulse rate of greater than 120 can be used to determine priority 1 status[39].

The triage sieve should take no more than 20 seconds for each non ambulant patient, and first look triage can therefore be done very rapidly. This broad-brush approach gives some urgently needed direction to the health service response which can then be focused on the care of the priority 1 patients. Since the sieve is so quick it is easily repeated at any stage of the response and should be applied whenever a large number of patients need to be rapidly assessed[40]. As triage decisions become more complex the triage methods become more refined.

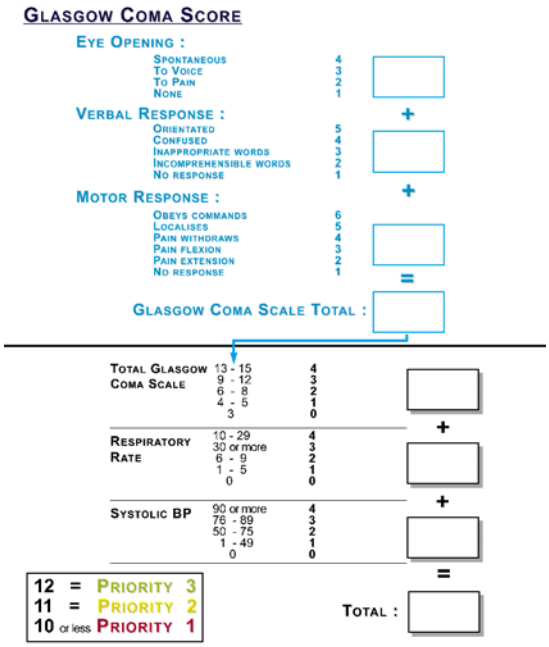

Figure 6. Triage sort (secondary triage)

The triage sort is the next step up from the triage sieve and consists of a formal physiological appraisal of the patient. No anatomical descriptors of injury are sought at this stage since the treatment that is being considered (i.e. the need for resuscitation) does not depend on such information. The triage sort is based on the TRTS as developed by Champion. It uses respiratory rate (RR), systolic blood pressure (SBP) and the Glasgow coma scale (GCS) to assign a score of between 0 and 12 for each patient The TRTS (triage sort) is relatively quick to perform and yields consistent valid results[41].

It compliments and extends the triage sieve method discussed earlier in that it uses one of the same measure values (respiratory rate), substitutes a more complex measure of circulatory function (systolic blood pressure) and introduces an assessment of conscious level. The need to measure both blood pressure and perform Glasgow Coma Scores increases the time needed to assess each patient; a skilled assessor should still be able to categorize a patient within 1 minute[42]. If the fourth (expectant) priority is used then a TRTS of between 1 and 3 should be used as its definition.

The triage sort described here is appropriate in situations where slightly more time can be spent in assessing each patient (either because there are less patients, because there are more people to carry out the assessment or because the speed of assessment is less important than the accuracy). The physiological measures used in this score are the same as those commonly measured when patients are being monitored. The triage revised trauma score is therefore doubly useful in that it serves both as a triage tool, and as a clinically useful tool for monitoring the patient's condition. If anatomical information is required then the triage sort must be combined with some form of survey as described below[43].

Triage and Order of Intervention

The triage priority of an individual casualty is only one of a number of factors that should be considered when the order of interventions is being decided. This point needs to be emphasized since the triage category is too often seen as an absolute guide to order. The other factors to be considered will vary according to the intervention that is being considered[44]. The obligation doctor responsible for the EC must guarantee persistent reassessment of those patients who stay holding up and, if the clinical elements change, re-triage the patient in like manner41.

Conclusion

Triage is a method of quickly identifying victims who have immediately life-threatening injuries and who have the best chance of surviving by different types of triage e.g. Start Triage, Triage Sieve, Triage Sort (secondary triage) and these mainly used in disasters but also used ED (Emergency Daily) triage e.g. The South African Triage Scale (SATS), Emergency Severity Index Triage (ESIT) and Australasian Triage Scale (ATS) and all these methods of triage aimed to ensure that the patient who need immediate treatment treated first without

any possible harmful delay, Priority of treatment, available resources and the main benefits of triage are reduction in waiting time and overcome Crowdness patients in ER. Nowadays, several European countries have implemented one of the triage scales so we can apply in our hospitals

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