Chapter 5. The Role of Vital Signs in ESI Triage

Introduction

In this chapter, we focus on decision point D—the patient’s vital signs. To reach this point in the ESI algorithm, the triage nurse has already determined that the patient does not meet ESI level-1 or level-2 criteria and that he or she will require two or more resources. Since the patient requires two or more resources, he or she meets the criteria for at least an ESI level 3. It is at this point in the algorithm that vital signs data are considered and the triage nurse must assess the patient’s heart rate, respiratory rate, oxygen saturation, and, for children under age 3, temperature (see Chapter 6 for more detailed information concerning the use of ESI for pediatric triaging). If the danger zone vital sign limits are exceeded (as illustrated in decision point D, Figure 5-1, the triage nurse must strongly consider up-triaging the patient from a level 3 to a level 2.

It is always the decision of the experienced triage nurse to determine whether the patient meets criteria for ESI level 2, based on his or her past medical history, current medications, and subjective and objective assessment that includes general appearance. This decision is based on the triage nurse’s clinical judgment and knowledge of normal vital sign parameters for all ages and the influence of factors such as medications, past medical history, and pain level.

Are Vital Signs Necessary at Triage?

Prior to the advent of five-level triage in the United States, tradition dictated that every patient presenting to an emergency department should have a set of vital signs taken before triage-level assignment. Vital signs were considered an integral component of the initial nursing assessment and were often used as a decision-making tool. In a traditional three-level triage system, vital signs helped determine how long a patient could wait for treatment (i.e., if no abnormal vital signs were present, in many cases, the patient could wait a longer period of time). Essentially, ESI level-1 and level-2 patients often are taken to an area with immediate staff attention prior to the point in triage when vital signs would normally be taken.

There is frequently discussion about why vital signs are not a more important part of ESI criteria. Vital signs are important; however, they are not always helpful in determining an initial triage level. An objective assessment of the patient, including the patient’s chief complaint, is often sufficient to categorize the patient as a high-acuity patient (ESI level 1 or 2), or low-acuity patient (ESI level 3, 4, or 5). However, the ESI Triage Research Team recommends obtaining a full set of vital signs at triage, including temperature, heart and respiratory rates, and blood pressure. Nurses are accustomed to this practice, and we have found that when vital signs are not obtained at triage, in particular for lower acuity chief complaints, they may never be obtained during the ED stay. Furthermore automatic BP cuffs and pulse monitors rapidly accomplish this task in most emergency departments.

More recently, newer triage models, including ESI, advocate selective use of vital signs at triage (Gilboy, Travers, Wuerz, 1999). Initial vital signs are not a mandatory component of other five-level triage systems and in general are not reported during the triage phase of a level-1 or level-2 patient (i.e., those patients with the highest acuity). For example, the Guidelines for Implementation of the Australasian Triage Scale in Emergency Departments states that “vital signs should only be measured at triage if required to estimate urgency, or if time permits” (Australasian College for Emergency Medicine [ACEM], 2000). Similarly, the Canadian Triage and Acuity Scale upholds the need for vital signs if, and only if, they are necessary to determine a triage level (in the cases of levels 3, 4, and 5) as time permits (Beveridge et al., 2002). The Manchester Triage Group uses specific vital-sign parameters as discriminators.
Using Vital Signs with ESI Triage

Using ESI triage, the only absolute requirement for vital signs assessment at triage is for patients who meet level-3 criteria. Vital sign assessment at triage is optional for patients triaged as ESI level 1, 2, 4, or 5. While the ESI system does not require vital signs assessment on all patients who present to triage, local policies may dictate a different procedure. Factors such as staffing levels, case mix, and local resources influence individual hospital policies regarding vital signs at triage and are beyond the scope of this handbook. In general when triaging a stable patient, it is never wrong to obtain a set of vital signs, unless you delay placement to obtain vital signs. The developers of the ESI and the current ESI research team believe that experienced ED nurses can use vital sign data as an adjunct to sound clinical judgment when rating patients with the ESI. There is limited evidence on the ability of abnormal vital signs to predict serious illness. The ESI has been revised over time to reflect changes in the available evidence and recommendations from the literature. The ESI working group initially used the systemic inflammatory response syndrome (SIRS) literature (Rangel-Frausto et al., 1995) in developing the danger zone vital sign box and accompanying footnotes.

The first version of the ESI used the SIRS criteria to include a heart rate of greater than 90 (for adults) as an absolute indicator to up-triage from ESI level 3 to level 2 (Wuerz, Milne, Eitel, Travers, Gilboy, 2000). The SIRS research was based on predictors of mortality in an intensive care unit population. Based on an excess of false positives using these criteria for ED patients at the initial ESI hospitals, the heart rate cutoff was changed to 100 in ESI version 2, and nurses were instructed to consider up-triage to ESI 2 for adult patients with heart rates greater than 100 (Gilboy, Tanabe, Travers, Eitel, Wuerz, 2003; Wuerz et al., 2001). Additionally, pediatric vital signs were added to the danger zone vital signs box (American College of Emergency Physicians [ACEP], 2003).

When using ESI as a triage system, vital signs assessment is not necessary in the triage area for patients who are immediately categorized as level 1 or 2. If the patient appears unstable or presents with a chief complaint that necessitates immediate treatment, then transport of the patient directly to the treatment area should be expedited. For these patients, the resuscitation team is responsible for obtaining and monitoring vital signs at the bedside. This would include patients that have clinical appearances that indicate high risk or need for immediate cardiovascular or respiratory intervention. These patients may appear pale, diaphoretic, or cyanotic. The triage nurse always has the option to perform vitals in the triage area, if an open bed is not immediately available or if he or she feels that the vital signs may assist in confirming the triage acuity level.

Some patients may not be identified initially as ESI level 1 until vital signs are taken. For example, an awake, alert elderly patient who complains of dizziness might be found to have a life-threatening condition when a heart rate of 32 or 180 is discovered during vital sign measurement. In this case, the patient should be assigned ESI level 1 no matter how “good” the patient appears.

As shown in the ESI algorithm in Chapter 2, if patients do not meet ESI level-1 or level-2 criteria, the triage nurse comes to decision point C. The nurse then determines how many resources the patient is expected to need in the ED. If the patient is expected to need one or no defined resources, he or she can be assigned an ESI level of 4 or 5 and no vital sign assessment is necessary. But if the patient is expected to need two or more resources, then the nurse comes to decision point D and vital signs should be assessed.

Vital signs can play a more important role in the evaluation of some patients at triage, especially
those triaged as ESI level 3. The range of vital signs may provide supporting data for potential indicators of serious illness. If any of the danger zone vital signs are exceeded, it is recommended that the triage nurse consider up-triaging the patient from level 3 to level 2.

Vital signs explicitly included in ESI triage include heart rate, respiratory rate, and oxygen saturation (for patients with potential respiratory compromise). Temperature is specifically used in ESI triage for children under age 3. It is important to note that when considering abnormal vital signs, blood pressure is not included in the ESI algorithm. This does not mean that the triage nurse should not take a blood pressure or a temperature on older children or adults but that these vital signs are not necessarily helpful in selecting the appropriate triage acuity level.

**Vital Signs and Pediatric Fever**

As shown in Figure 5-2, note D of the ESI algorithm addresses pediatric fever considerations for ESI triage. This section incorporates recommendations from the American College of Emergency Physicians’ *Clinical Policy for Children Younger Than Three Years Presenting to the Emergency Department With Fever* (ACEP, 2003), reapproved in 2009 by ACEP Board of Directors.

The ESI Triage Research Team recommends that vital signs in all patients under age 3 be assessed at triage. For patients in this age group, vital sign evaluation, including temperature measurement, is essential to the overall assessment (Baraff, 2000). This helps to differentiate ESI level-2 and level-3 patients and minimize the risk that potentially bacteremic children will be sent to an express care area or otherwise experience an inappropriate wait. Remember, if a patient is in immediate danger or high risk, he or she will be assigned to either ESI level 1 or 2.

Table 5-1 provides direction for the triage nurse in using the ESI to assess the febrile child and determine the most appropriate triage level. The generally accepted definition of fever is a rectal temperature greater than 38.0° C (100.4° F) (ACEP, 2003; Baraff et al., 1993). The infant less than 28 days old with a fever should be considered high risk and assigned to at least ESI level 2. There are no clear guidelines for the infant between 28 days and 3 months of age. The ESI research team recommends triage nurses rely on local hospital guidelines. We suggest that the nurse consider assigning at least an ESI level 2 for such patients.

Version 4 of the ESI incorporates a different set of pediatric fever guidelines for children ages 3-to-36 months. These pediatric fever considerations pertain...
to highly febrile children, defined as those with a fever of greater than 39.0°C (102.2°F) (ACEP, 2003). When triaging a child between 3 and 36 months of age who is highly febrile, it is important for the triage nurse to assess the child's immunization status and whether there is an identifiable source for the fever.

The patient with incomplete immunizations or with no identifiable source for the fever should be assigned to at least ESI level 3. If the patient has an identifiable source for the fever and his or her immunizations are up to date, then a rating of 4 or 5 is appropriate. For example, a 7-month-old who is followed by a pediatrician has had the Haemophilus influenza type b vaccine and presents with a fever and pulling on his ear could be assigned to an ESI level 5.

Case Examples

The following case studies are examples of how vital signs data are used in ESI triage:

“My doctor told me I am about 6 weeks pregnant and now I think I am having a miscarriage,” reports a healthy looking 28-year-old female. “I started spotting this morning and now I am cramping.” No allergies; no PMH; medications: prenatal vitamins. Vital signs: T 98° F, HR 112, RR 22, BP 90/60. This patient meets the criteria for being up-triaged from a level 3 to a level 2 based on her vital signs. Her increased heart rate, respiratory rate, and decreased blood pressure are a concern. These factors could indicate internal bleeding from a ruptured ectopic pregnancy.

“The baby has had diarrhea since yesterday. The whole family has had that GI bug that is going around,” reports the mother of a 15-month-old. She tells you the baby has had a decreased appetite, a low-grade temperature, and numerous liquid stools. The baby is sitting quietly on the mother's lap. The triage nurse notes signs of dehydration. No PMH, no known drug allergies, no medications. Vital signs: T 100.4° F, HR 178, RR 48, BP 76/50.

Prior to vital sign assessment, this baby meets the criteria for ESI level 3. Based on vital sign assessment, the triage nurse should up-triage him to an ESI level 2. For a baby this age, both heart rate and respiratory rate criteria are violated.

“I need to see a doctor for my cough. I just can't seem to shake it. Last night I didn't get much sleep because I was coughing so much. I am just so tired,” reports a 57-year-old female. She tells you that she had a temperature of 101° last night and that she is coughing up this yellow stuff. Her history includes a hysterectomy 3 years ago; she takes no medications but is allergic to Penicillin. Vital signs: T 101.4°, RR 36, HR 100, SpO2 90 percent.

At the beginning of her triage assessment, this patient sounds as though she could have pneumonia. She will need two or more resources but her low oxygen saturation and increased respiratory rate are a concern. After assessing vital signs, the triage nurse should up-triage the patient to an ESI level 2.

A 34-year-old obese female presents to triage complaining of generalized abdominal pain (pain scale rating: 6/10) for 2 days. She has vomited several times and states her last bowel movement was 3 days ago. She has a history of back surgery, takes no medications, and is allergic to peanuts. Vital signs: T 97.8° F, HR 104, RR 16, BP 132/80, SpO2 99 percent.

This patient will need a minimum of two or more resources: lab, IV fluids, perhaps IV medication for nausea, and a CT scan. The triage nurse would review the patient's vital signs and consider the heart rate. The heart rate falls just outside the accepted parameter for the age of the patient but could be due to pain or exertion. In this case, the decision should be to assign the patient to ESI level 3.

A tearful 9-year-old presents to triage with her mother. She slipped on an icy sidewalk and injured her right forearm. The forearm is obviously deformed but has good color, sensation, and movement. The mother reports she has no allergies, takes no medications, and is healthy. Vital signs: BP 100/68, HR 124, RR 32, and SpO2 99 percent.

This child is experiencing pain from her fall and is obviously upset. She will require at least two resources: x ray and orthopedic consult, and perhaps conscious sedation. Her heart rate and respiratory rate are elevated, but the triage nurse should feel comfortable assigning this patient to ESI level 3. Her vital sign changes are likely due to pain and distress.
A 72-year-old patient presents to the ED with oxygen via nasal cannula for her advanced chronic obstructive pulmonary disease (COPD). She informs the triage nurse that she has an infected cat bite on her left hand. The hand is red, tender, and swollen. The patient has no other medical problems, uses albuterol prn, and takes an aspirin daily. No known drug allergies. Vital signs: T 99.6°F, HR 88, RR 22, BP 138/80, SpO2 91 percent. She denies respiratory distress.

This patient will require two or more resources: labs and IV antibiotics. She meets the criteria for ESI level 3. The triage nurse notices that her oxygen saturation and respiratory rate are outside the accepted parameters for the adult but this patient has advanced COPD. These vital signs are not a concern so the patient should not be up-triaged but will stay an ESI level 3. If this patient had any type of respiratory complaint, she should be up-triaged to ESI level 2 due to the low SpO2, which may or may not be normal for this particular patient.

A 25-year-old patient presents to the ED triage nurse with a chief complaint of nausea, fever, chills, and sore throat for several days associated with decreased ability to take fluids. He denies any past medical history or taking any medications. Vital signs: T: 102.3, HR 124, RR 20, BP 125-80, SpO2 99% on RA.

This patient will require two or more resources: IV fluids and medications. His HR violates vital sign parameters; however, this is most likely due to his fever. He should not be up-triaged and should be assigned ESI level 3. The triage nurse should administer acetaminophen at triage if the ED has such a policy.

A 19-year-old patient arrives by Emergency Medical Services (EMS) having an anxiety attack. She was in court and began to feel lightheaded and dizzy; the paramedics were called. Upon arrival she is hyper-ventilating, crying, and unable to speak in sentences. She also states she has not felt well recently and has nausea and vomiting. She denies any past medical history. Vital signs: T 98.6, HR 108, RR 40, BP 130/80, SpO2 100% on RA.

This patient may require two or more resources; IV fluids and medications. While her HR and RR violate vital sign criteria, she should be triaged as ESI level 3. The triage nurse would not give this patient the last monitored bed as she is stable to wait. The nurse should assist the patient in slowing down her breathing.

Summary

The information in this chapter provides a foundation for understanding the role of vital signs in the Emergency Severity Index triage system. We addressed the special case of patients under 36 months of age. Further research is necessary to clarify the best vital sign thresholds used in emergency department triage.

Note: Appendix A of this handbook includes frequently asked questions and post-test assessment questions for Chapters 2 through 8. These sections can be incorporated into a locally-developed ESI training course.

References


