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Initial Pediatric Assessment in the Emergency Room

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In pediatrics, the priority goals of emergency medicine are: recognize a child with a life-threatening condition and establish priorities for care.

In some aspects, pediatric assessment is difficult because it requires knowledge of normal and abnormal child development and specific skills in assessing patients.[1]

The classic assessment has the purpose of establishing a specific diagnosis, which can be time consuming in a situation where lack of optimization can have life or death consequences.

Initial assessment is a process different from diagnosis; the primary objective of the former is to identify anatomic and physiological abnormalities, in order to assess the patient's severity and determine the promptitude and intensity of initial treatment. In this phase, examining room and laboratory studies are not decisive components. General, or specific, treatment focuses on restoring bodily and physiological homeostasis, in other words to prevent evolution to respiratory failure, shock, or cardiopulmonary insufficiency. It is not the time to make a specific diagnosis.

In recent years, worldwide, the principal courses given in the area of emergency care of pediatric patients have adopted a systematic approach to evaluation, which includes four components:

1) Initial evaluation or the "pediatric evaluation triangle".

2) Primary evaluation or "ABCDE".

3) Secondary evaluation.

4) Tertiary evaluation or diagnosis.

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Pediatric evaluation triangle (Figure 1)

The pediatric evaluation triangle was developed as a tool to identify pediatric patients with a life-threatening clinical condition, and prioritize the need for care based on the patient's condition.[2]

The pediatric evaluation triangle is a rapid assessment which does not require touching the patient; it is a recognition of patterns used to categorize the patient based on their severity. The three components that make up the pediatric evaluation triangle are:

1. *Appearance* (Table 1)

Evaluation of appearance is fundamental in patients of pediatric age**.** On evaluating appearance we can evaluate, *grosso modo* and without making categorical claims, the status of the central nervous system and the patient's interaction with his environment.

2. *Respiratory effort* (Table 2)

Respiratory effort reflect the child's attempt to compensate for deficiencies in oxygenation and ventilation. In the evaluation we observe movements and listen to sounds that accompany breathing.

3. *Circulation to the skin* (Table 3)

Evaluation of circulation, when it is abnormal, can almost always orient a hemodynamic problem.

Based on the findings recorded in the segments of the pediatric evaluation triangle, patients can be categorized in seven different statuses which indicate the severity of their condition and the priority for their care. (Table 4)

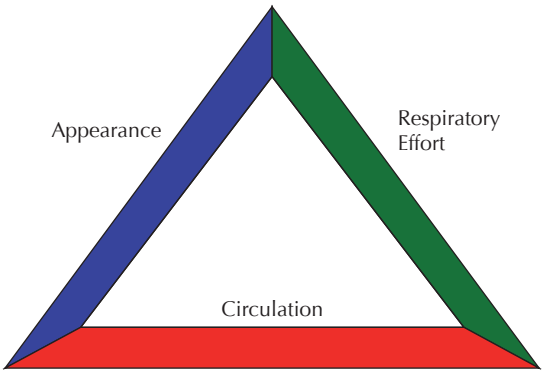

Figure 1

Primary evaluation (Table 5)

The primary evaluation is a systematic approach which is divided in five sections. In this evaluation the examining physician touches the patient and makes use of auxiliary instrumental procedures, such as: pulse oximetry, auscultation, and measuring blood pressure.

The priority is systematization to attempt to solve the problem, and although a team of several persons can address several sections at once, problems found should always be solved in the order established for the evaluation.

Airway

In this section the priority is to verify permeability and whether or not it can be maintained. The maneuvers performed may vary from positioning the head to surgical creation of an airway, in case of total blockage.

Good ventilation

It is necessary to ensure that the patient's ventilation is effective and adequate. A practical system to evaluate and act in case of unstable ventilation is:

Table 1. Characteristics to evaluate in appearance

Characteristics to evaluate	What to look for (Depending on level of development and age group)
Tone	Normal tone, flaccidity, absence of motion, resistance to evaluation, stands or sits
Interaction	How alert is the patient? Does he try to hold or play with objects when being examined? How strongly does he react to environmental stimuli?
Consolability	How much does he console himself with the caregiver? Does he remain irritable despite the caregiver's care?
Gaze	Does he fix his gaze? Does he look at us when we speak to him? Does his gaze wander?
Crying/speech	Is the patient's crying disproportionate to the situation? Is it strong or weak or does he just groan? Is his speech unintelligible?

Table 2. Characteristics to evaluate in respiration

Characteristics to evaluate	What to look for
Sounds	Normal respiration, noisy respiration, stridor, gasping, wheezing
Position	Freely chosen position, tripod position, olfactory position, rejection of supine position
Signs of respiratory difficulty	Intercostal strain, retractions, nasal flutter, thoracoabdominal dissociation.

Table 3. Characteristics to evaluate for circulation in skin

Characteristics to evaluate	What to look for
Coloration	Normal coloration, pallor, cyanosis, ruddiness, marble skin, purpuric lesions.

Table 4. Categorization of patient's state based on PET

Appearance	Respiratory effort	Circulation to skin	Possible state
Abnormal	Normal	Normal	Primary cerebral dysfunction or systemic disease
Normal	Abnormal	Normal	Respiratory difficulty
Abnormal	Abnormal	Normal	Respiratory insufficiency
Normal	Normal	Abnormal	Compensated shock
Abnormal	Normal	Abnormal	Decompensated shock
Abnormal	Abnormal	Abnormal	Cardio-respiratory insufficiency
Normal	Normal	Normal	Patient stable

Is the patient breathing?

How many respirations per minute does he have?

Does he breathe with difficulty?

What does auscultation find when the patient breathes?

How effective is his respiration?

Pulse oximetry is a useful tool that can indirectly indicate the presence of hypoxemia based on the percentage of saturation of oxyhemoglobin.

Table 5. Primary Evaluation

	What to look for	Actions or maneuvers to perform
A. Airway	Stridor, wheezing, noisy respiration, foreign objects.	Position the head Use devices for the airway Suction
B. Ventilation	RR, Auscultation, Signs of respiratory difficulty. Pulse oximetry, capnography.	Use of oxygen devices Ventilation with bag valve mask Tracheal intubation Release of pneumothorax or insertion of pleural drain
C. Circulation	Rate and rhythm Pulses, capillary filling T/A, skin coloration and temperature	Electric therapy Treatment of arrhythmias Placement of vascular access Infusion of fluids and vasoactive drugs
D. Disability	AVPU scale, pupillary reaction, thick tone, abnormal movements. DxTx.	Assurance of airway Anti-edema measures Treatment of seizures Administration of glucose
E. Exposure	Apparent lesions, temperature	Full exposure Local control of bleeding Stabilization of fractures

Circulation

After evaluating ventilation and correcting it if necessary, proceed to evaluate circulation.

Rate and rhythm. Detecting potentially fatal bradycardia or arrhythmias requires immediate actions: assisted ventilation, cardiopulmonary resuscitation, and electric therapy.

Pulses and capillary filling.

Skin temperature.

Blood pressure.

Neurological disability and dextrose.

The patient's neurological state can be evaluated quickly by means of the AVDI scale (Table 6). To evaluate the possibility of hypoglycemia, which may be the cause of an alteration in state of alert, an examination with a blood sugar reagent strip is useful.

Exposure

The last step involves complete exposure of the patient to check for lesions, bleeding, or signs of disease such as petechiae, ecchymosis, or reddening of the skin. It is very important to respect privacy in older patients. Always take body and ambient temperature in this section, if it has not been done yet, and treat fever the same as hypothermia.

Secondary evaluation

Performing the first two stages of the pediatric evaluation helps to identify life-threatening clinical situations and act accordingly, with actions or procedures focused on correcting such potentially fatal problems.

The next step is to collect data, from either the patient or a responsible family member, by means of targeted questioning which can be easily remembered with the mnemotechnic "SAMPLE":

Table 6. AVPU scale

Category	Stimulus	Type of response	Reaction
Alert (A)	Environment	Appropriate	Normal interaction
Voice (V)	Sound stimulus or simple orders	Appropriate Inappropriate	Responds to her name Confused
Pain (P)	Pain	Appropriate Inappropriate Pathological	Withdrawal Unintentional sound or movement Abnormal postures
Unresponsive (U)	Any	NO	NO RESPONSE

S: signs and symptoms.

A: allergies.

M: specific medications, ponderal dose, dosage interval and time since last dose.

P: past, personal pathological antecedents.

L: libation, time elapsed since last food and its nature.

E: events that could have contributed to the patient's present state. [1,3]

Then perform an exhaustive topographic physical examination, called "head to foot" looking for new data that may clarify the causes of the patient's state and suggest a possible diagnosis.

Tertiary evaluation or diagnosis

Finally, the suspected diagnosis should be corroborated with targeted studies based on the findings.

Throughout the assessment and in each step it is indispensable to constantly reevaluate, because the condition of patients in critical state may change from moment to moment.

CONCLUSION

The initial pediatric assessment is unique because the child has specific characteristics based on his age group, which can make it more laborious and difficult to interpret.

All healthcare professionals who provide care for children are obliged to know how to approach a problem systematically to evaluate their situation.

Pediatric assessment is one more tool, of all those available to pediatricians, to provide comprehensive, quality care for our patients, which should be the primary objective of our medical practice.

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