

The acutely ill child, part II

Case discussion 1: Sepsis

- 4 year old boy is brought to Emergency due to stomach pain and vomiting. Seen initially by pediatrician.
- The hx includes no significant fever or diarrhea. Unclear when the last bowel movement occurred.
- Exam reveals an extremely tender abdomen and possible pos rebound.
 - Medical or surgical problem?

Case 1

- Constipation is suspected and the child receives an enema with no positive effect.
- The surgery team is consulted but are occupied with an acute operation and the child is left waiting in the ED. 3 hours later the surgery resident sees the patient and diagnoses a "surgical abdomen" – the patient is listed for surgery and comes to the OR one hour later, having received some maintenance fluids.
 - Would you do anything differently so far?

Case 1

- Surgery reveals a gangrenous ruptured appendix. The abdomen is lavaged thoroughly with warm NS and antibiotic coverage is broadened. Abdomen is closed and patient extubated and taken to recovery room.
 - How would you monitor this patient?

Case 1

- Initial vital signs in the RR:
 - HR = 170, RR = 50, BP 90/60
 - Is this normal? What explanation is possible?
- After 1,5 hours the patient is sent to the ward.

Case 1

- Three hours later the patient is unresponsive, cold with thready pulses and capillary refill of 4 - 5 seconds.
 - What is the diagnosis?
 - How should management proceed?

Case discussion 2: trauma

- 3 year old attacked by dog. Large lacerations to the head, scalp, face and upper extremities. Taken initially to local hospital and then transferred by ambulance after bandaging the wounds and an iv placed.
 - What possible problems might this child have?
 - What things will you want to check when he arrives?

Case 2

- Initial vital signs: HR = 150, RR = 25, BP = 85/60, capillary refill 3 sec., O₂ saturation 98% with flow-by oxygen, Hb 9,5 g/dl
- Exam reveals multiple large cuts/lacerations. Bandages are soaked but there is little active bleeding when the bandages are removed. Anesthesia and surgery are needed to close the wounds.
 - How do you prepare the child for anesthesia? Further information needed?
 - What will be his weight?

Case 2

- Anesthesia is induced. Concerns around induction? Monitoring needed? Choice of induction agent?
- Anesthesia proceeds for 30 minutes when the patient's heart suddenly falls from 140 to 100. Is this a problem?
- The HR falls from 100 to 80, then to 60 and finally to 30. You confirm that even the pulse has fallen and is very slow. The oxygen saturation falls now from 95% to 80% and continues to fall.
 - What do you do?

Case 2

- The operation is stopped.
- The endotracheal tube is checked and breath sounds are heard on both sounds. The chest is rising with each manual breath that you give.
- Oxygen is increased.
- Fluid is given
 - What kind and how much?
 - Any other medications?

Case 2

- Adrenalin 0,1 mg/ml, 1,4 ml is given iv (= 10 mcg/kg, 0,1 ml/kg)
- At the same time, manual breaths are given, 20/minute
- Chest compressions are given, 100/minute
- After 1 minute CPR is stopped and the heart rate and pulse have returned to 160.
 - Other tests and treatments?

Case 2

- Hb is re-checked and has fallen to 4,0.

Ringer lactate has been given 20 ml/kg (280 ml) x 2

O- neg blood is given as well while the operation is completed and the patient is taken back to the ICU still intubated.

- What is the total blood volume of this child?
 - $80 \text{ ml} \times 14 \text{ kg} = 1120 \text{ ml}$ (40% of blood volume = 450 ml)
- What could we have done better?

A B C D E



”Have our interventions given the desired results ?”

”Have new problems come up at previous levels ?”

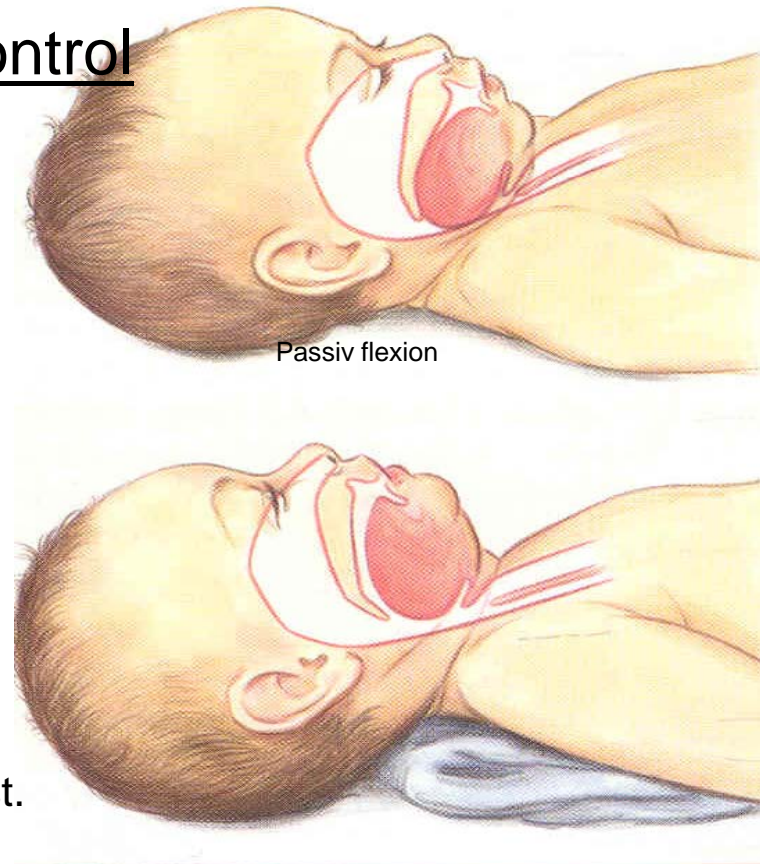
A - Airway with Cervical Spine Control

Large occiput and tongue.

Children < 6 months obligate nose-breathers

Larynx more anterior and cranial

Trachea is short, soft and the cricoid ring is narrowest.



B - Breathing with ventilation

Look, listen, feel!





C - Circulation and bleeding



C - Circulation and bleeding

BLOOD ON THE FLOOR AND FOUR MORE !

Synlig blödning

Thorax: Hjärta, lungor och stora kärl

Buk: Lever, mjälte, njurar, kärl

Bäcken: Frakturer och kärl

Skalle: Subgaleära hematom.



C - Circulation and bleeding

Hypovolemic shock in children

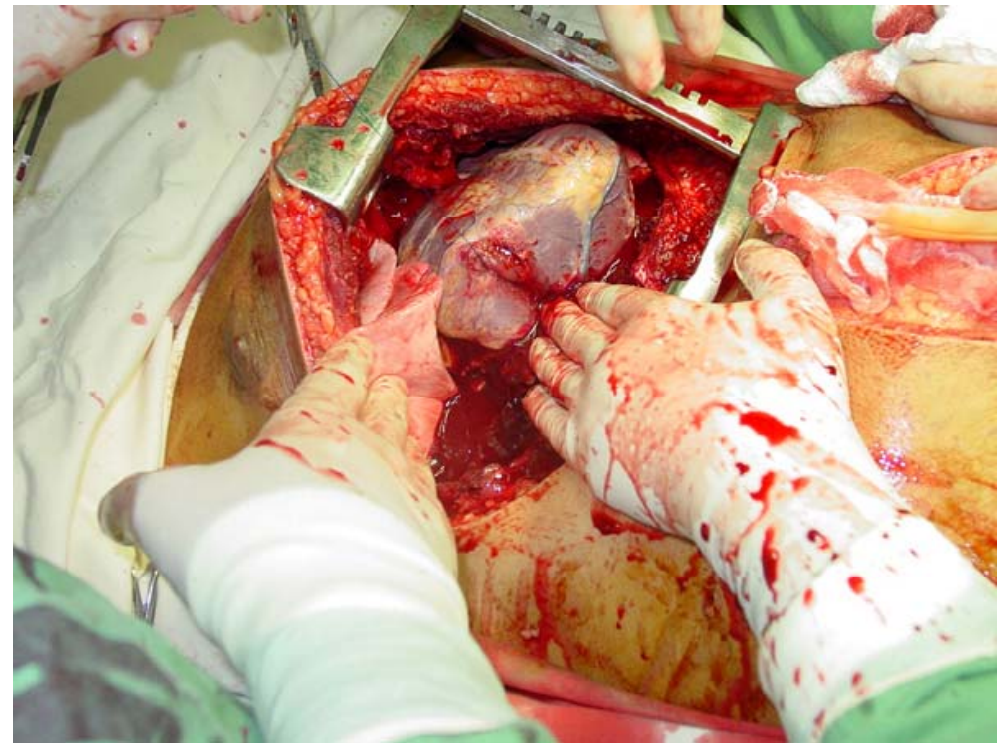
Pale, cool, mottled skin.

Tachycardia – Bradycardia - Asystole

Rapid, shallow breathing.

Agitation. Lethargy. Loss of consciousness.

Anuria



C

Cirkulation

Good sympathetic reflexes – can lead to rapid deterioration

Subtle signs/symptoms of pre-shock

Blood loss <30% often no signs

Earliest signs – decreased capillary refill and tachycardia

C Early signs of hypovolemic shock in children

Poor peripheral perfusion with decreased capillary refill. Normally
< 2 seconds.

Tachycardia – non-specific

Agitation if awake

Rapid shallow breathing

Pale, cool, mottled skin

Decreased level of consciousness

Signs of significant hypovolemia

Blood pressure = late sign. 45% av blood volume.

Tachycardia turns into bradycardia when hypotension occurs.

Anuria.

C - Circulation and bleeding

Vascular access

Peripheral **V**ein **C**atheter 90 sekunder

Scalp vein < 1 år

V. Saphena Magna, V. Femoralis,

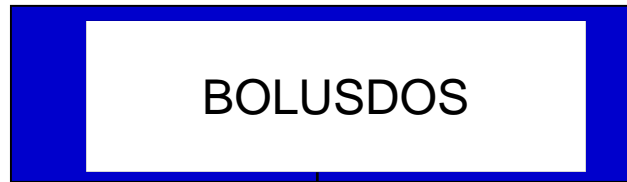
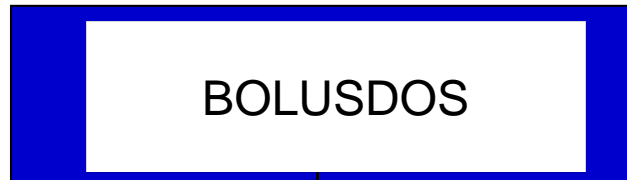
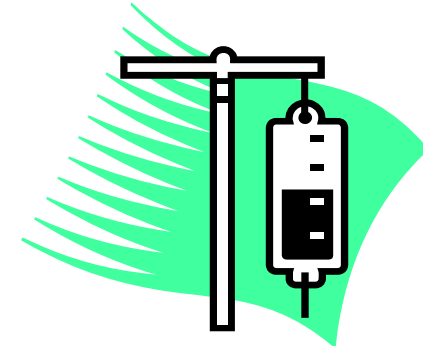
V. Jugularis

Intraosseus needle

Central **V**ein **C**atheter (ultrasound)



C - Circulation and bleeding



Evaluate effect

Evaluate effekt

