Preoperative examination of the child

BAPA & SKA
RC 16/01/2016
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Aims of preop evaluation

- evaluate the present health status
- detect an unknown pathology
  at risk situation
- give explanations/instructions
- plan postop pain stategy
- obtain informed consent / assent
- obtain reference values in case of major surgery (Hb, hemostasis etc)

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Two questions

1. Is this child really ASA 1 or 2 ?
2. Could anything modify my anesthetic plan ?

Prerequisites

good knowledge of

- normal child development
- pediatric medicine
- pediatric procedures

3 situations

- pre-anesthetic visit
- evaluation on admission (D0 or D-1)
- emergency cases

Outline

- History
- Physical examination
- Context

History

- present problem (why is he/she coming for ?)
- medical – surgical- anesthetic history

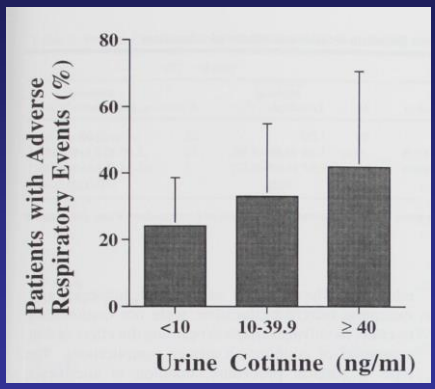
  events, ⦸ ETube…
- neonatal period : term ?

  post-conceptual age = gestational + post-natal
- family history regarding anesthesia

  problems: long apnea, unexpected death or ICU

Any passive exposure to tobacco ?

- n = 499 children
- urinary [] of cotinine
- respiratory complications by observer



Anesthesiology 1998; 88: 1144-53

Upper airway infection (1)

✓ At the time of admission :
risk of respiratory complications ⇧⇧ if

- < 1 year-old
  yellow-green nasal secretions
  moist cough, wheezing, crakles
  fever > 38.5 °C, otitis media
  parent says child is « unwell »
  passive tobacco exposure
- ex-premie, lung disease, airway manipulation

Upper airway infection (2)

The asymptomatic child who had
upper airway infection during the last 2 weeks

= relative risk of respi complication x 5.65 !

Lancet 2010; 376:773-83

individualized balance :
benefit of procedure / risk of anesthesia

Upper airway infection (3)

If you decide to proceed :

salbutamol 30 minutes before induction

nebulizer: 1.25 mg (5 drops) if < 1 y
2.5 mg (10 drops) if < 20 kg
5 mg (20 drops) if > 20 kg
or puff (expansion chamber) : 100- 200 µg

Pediatr Anesth 2009; 19: 1064-9

Asthma

- ⇧ because pollution, exposure to allergens
- before 6 y :
- 40% wheezers are non-atopic
  wheezing when viral infection
  > 6 y : ⇧ risk for bronchospasm (exercise-induced)
- 60% wheezers are atopic
  IgE ⇧ & RAST +
  familial history +, allergy to milk, eggs etc
  eosinophils > 4%

Control criteria for anesthesiologist

group	criteria
1	history of asthma no symptoms, no problems, no R/
2	frequent crises asymptomatic with treatment
3	symptomatic despite R/ or recent deterioration

Preparation to anesthesia

- group 1 : 0
- group 2 : R/ as usual
  + aerosol $\beta_2$mim, 30 min before induction
  (same if exercise-induced asthma)
- group 3: - urgent: aerosol + steroids IV
  - elective : improve R/

💣 surrenals !

Current medical treatment ?

- current drug treatment
  - to be continued up to D0
  - stop aspirin > 3-5 j preop except Kawasaki
    single ventricle
    systemic shunt
- phytotherapy ? UK : 10-20% of cases
  arnica, echinacea, camomilla…
  often hidden /forgotten by parents (medicine ?)
  pharmacologic effects (cyt P450) !

stop 7 days in advance

The child on steroids

- to correct a deficit
  - congenital adrenal hyperplasia
  - pituitary problems
- for immunosuppression
  - cancer, post-transplant status
- cave hidden sources
  - inhaled corticosteroids
  - intraarticular/ intradermal triamcinolone
  - steroid creams

The child on steroids: adrenal crisis ?

- high level of suspicion if hidden source !

if chronic R/ same dose as usual on day 0

- what about a « stress » dose?

minor procedure : no

major procedure : 50 mg/m^2 + same dose over 24h
or 1 mg/kg hydrocortisone /6h ?
or 6-8 mg/m^2/24h in 3 doses ?

- check blood glucose & electrolytes, + BP

Allergies

Food: 4-6% of children

- eggs: allergy to ovalbumin

  propofol OK : lecithin = yolk protein

- soja: propofol OK : no proteins in oil
- peanut : propofol OK

Antibiotics

Latex: operated before 1 y
many procedures (urology)
cross allergy with exotic fruits: kiwi, banana

Obstructive sleep apnea

- 10% children snore during sleep
  30-50% = OSAS

Risk factors :

- large tonsils/adenoids
- facial hypoplasia (achondroplasia)
- macroglossia
- hypotonia (T 21, multiple handicap)
- micrognatism
- small pharynx
- sub-Saharian origin

OSAS : 3 presentations

	infant	child	teenager
cause	Craniofacial anomaly, hypotonia, prematurity	Lymphoid hypertrophy	Obesity, genetic, craniofacial
presentation	snoring failure to thrive respi. infections	snoring behavioral problems enuresis	snoring daytime somnolence hypertension boys > girls African origin
treatment	CPAP A, T & A, tracheostomy	T & A	T & A, weight loss

Obstructive sleep apnea

- look for it even if no ENT surgery !
- signs : disturbed sleep
  daytime somnolence
- OSAS = ⇧ risk for postop complications
  if < 2 y
  other medical problem
  nadir night preop $SpO_2 \leq 80\%$

Obstructive sleep apnea

Attitude :

- nocturnal oxymetry if any doubt
- ➢ if SpO_2 > 92% : OK
- ➢ if SpO2 < 92%: specialist opinion
  polysomnography ?

even trivial snoring = ⇗ risk of upper airway obstruction

↯ induction & awakening

Obesity

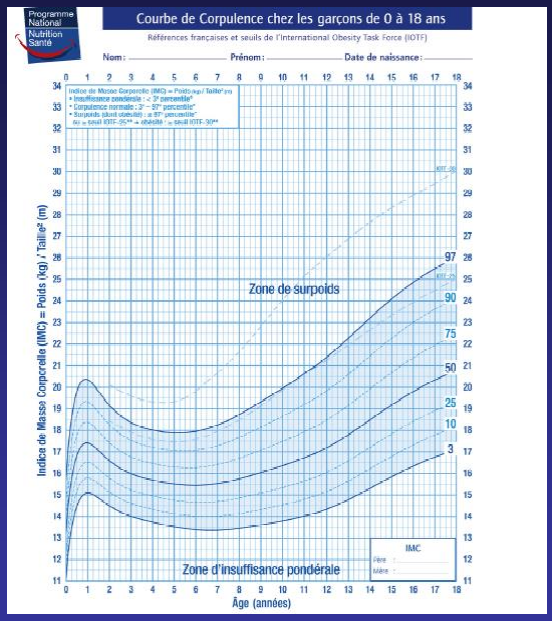
adults : BMI = kg/height(m)^2

- > 25 = overweight
- > 30 = obesity
- > 40 = morbid obesity

Children & adolescents :

↳ percentile of BMI f (age & sex)

USA: BMI > percentile 85 = overweight
BMI > percentile 95 = obesity
BMI > percentile 99 = extreme obesity



Causes (1)

- > 90%
  too much calories
  no physical activities (TV)
  (+) socioeconomic factors
  (+) genetic background: leptin deficit ?

Causes (2)

- 5% medical cause:
- syndromes (< 1%)
- corticotherapy (oncology)
- hypercaloric diet: metabolic diseases
- hypothalamic obesity (head trauma, RΘ)
  ↳ hyperinsulinism
- inactivity: some myopathies

Obesity

- comorbidities: asthma
  diabetes
  hypertension
  OSAS
- guess patient's lean body weight: dosage !
- difficult venous access
- upper airway obstruction

Unexplained loss of consciousness

- seizure ?
- dysrhythmia ?
  - Long QT
  - WPW
  - Brugada: ! young Asian male
- vagal ?

ECG, specialist opinion

The adolescent

- girl : menarch ?
  risk of pregnancy ?
- use of illicit drugs ?

Sensible issues in the presence of a parent ?

Useful information

- ✓ security blanket ? name ?
- ✓ sucks its thumb ?
  if yes, which ? → ~~infusion !~~
- ✓ right or left-handed ?
- ✓ preferred cartoon, character, film

Outline

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Clinical examination

- weight, height, BP
- cardiopulmonary auscultation
- abdomen (liver)
- mouth : opening
  loose teeth ?
  large tonsils ?
  Mallampati score ? OK if > 6 yr
  orthodontic device
  piercing

Blood pressure measurement

Questions :

- reliable ?
  adequate size BP cuff
  anxiety /pain
  « white coat » effect

- useful ?
  incidence of hypertension in children : 2-5 %
  threshold : SBP or DBP > P95 for height

Simple table to identify hypertension in children/adolescents

	BOYS		GIRLS	
	Systolic	Diastolic	Systolic	Diastolic
3	100	59	100	61
4	102	62	101	64
5	104	65	103	66
6	105	68	104	68
7	106	70	106	69
8	107	71	108	71
9	109	72	110	72
10	111	73	112	73
11	113	74	114	74
12	115	74	116	75
13	117	75	117	76
14	120	75	119	77
15	120	76	120	78
16	120	78	120	78
17	120	80	120	78
18	120	80	120	80

Pediatrics 2009 123 (6), e972-4

Simplified table

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11	113	74
12	115	74
13	117	75
14	120	75
15	120	76
16	120	78
17	120	80
18	120	80

3 to 11 y: SBP > 110 ?

12 to 18 y: SBP > 120 ?

Cases at higher risk for hypertension

renal disease
on steroids
on immunosuppression
intracranial process
history of coarctation of aorta
family history of hypertension

Clinical examination

- face : front : asymetry?
  sideview: retrognatism ?
  preauricular tags ?
  external ear malformation ?

= signs of branchial arch anomalies
= ⇧ risk of difficult intubation

Funny face

- Goldenhar
- Treacher Collins

Abnormal ears !

Signs of a potentially difficult airway

- external
  = expected difficult laryngoscopy / intubation

- functional : stridor
  signs of obstruction (retractions)
  = possible difficult laryngoscopy / intubation

maintain spontaneous ventilation
until airway secured

Clinical examination

- peripheral veins ?
- if perimedullar block foreseen :
  look at the spinal axis

Neuraxial examination (if block)

Mongoloïd birthmark

The unknown cardiac murmur

* « innocent » cardiac murmur:
  41% asymptomatic children 5-14 y
* probably functional if > 1 year old and
- ✓ systolic, variable (⇩ when upright)
- ✓ low intensity (= no thrill)
- ✓ short, no clicks
- ✓ localised (except functional pulmonary stenosis of the infant < 6 months)
- ✓ no limitation of physical activities

If any doubt: cardiologist's opinion !

Blood sampling ?

- Hb: if pale
- coagulation screening : INR, APPT, Fibrinogen
  if history +
  major, possibly hemorrhagic surgery
  or < 2 y & no surgical history

☹ thrombopathy
von Willebrand without ⇩ FVIII (II)
fibrinolysis

Hemostasis: highlights

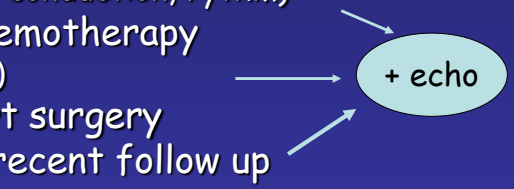
- « single cardiac ventricule »
  deficit in prot C & AT III
  = thrombophilia

- large venous malformation
  local fibrinolysis
  risk of perioperative bleeding (DIC)

specialist's advice

EKG ?

Only
- dysrhythmia : auscultation
- history of unexplained loss of consciousness
  long QT, dysrythmia, Ao stenosis
- congenital deafness : 0.3-0.6% = long QT
- myopathy (AV conduction, rythm)
- history of chemotherapy
  (anthracyclins ?)
- previous heart surgery
  with no recent follow up



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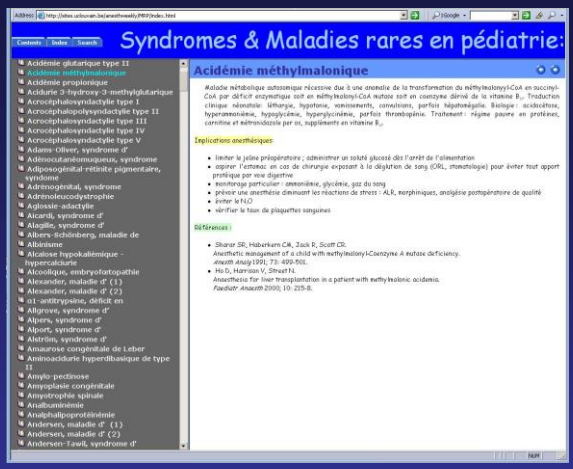
In presence of 1 congenital malformation look for others !

Rare disease

What is it ?

- a syndrome : Treacher-Collins, VACTERL
- a metabolic disease : mucopolysaccharidosis
- a cellular function problem :
  - mitochondrial disease
  - long QT etc…



www.orphanesthesia.eu

The refugiee

1) language barrier : familial /personal history ?
2) malnutrition : pharmacokinetics,
   wound healing
3) parasitosis : scabies …
4) tuberculosis ? serology ?
5) abnormal hemoglobin ?
   G6PD deficit ?

The ex-premie

- risk of per-post-operative apnea
  up to 50-60 weeks postconceptual age
  mainly if neurologic problem (IVH)
  bronchodysplasia
  apneic syndrome
  anemia ?
- present status ? on caffeine ? on O_2 ?

inguinal hernia repair: awake spinal or GA?
- lower BP durin GA
- ⇗ risk early apnea (first 30 min) after GA

Child with a muscle disease

- known or suspected diagnosis ?
  contact with neurologist !
- check cardiac and respiratory status

-if CPK ⇧: avoid halogenated agents
(anesthesia-induced rhabdomyolysis)
-if lactates ⇧ : best no propofol TIVA
(propofol infusion syndrome)

Down syndrome (T 21)

1) variable mental retardation
2) congenital heart disease ?
3) hypotonia, hypothyroidism
4) immunodeficiency

Down syndrome (T 21)

5) large tongue, subglottic stenosis
6) unstable C1-C2 junction
7) sleep apnea syndrome
   ↳ UA obstruction at induction & awakening
8) high incidence bradycardia with sevoflurane
9) difficult venous access

atropine premed ?

Cancer child

- leukemia, lymphoma ?
- usually for diagnostic procedure
  (bone marrow, lymph node)
- an anterior mediastinal mass is asymptomatic in 40% of cases

chest X-Ray!