Vývoj imunity po narození, očkování

MUDr. Zuzana Vančíková, CSc.

Vývoj imunitního systému novorozence a kojence

INVITED REVIEW

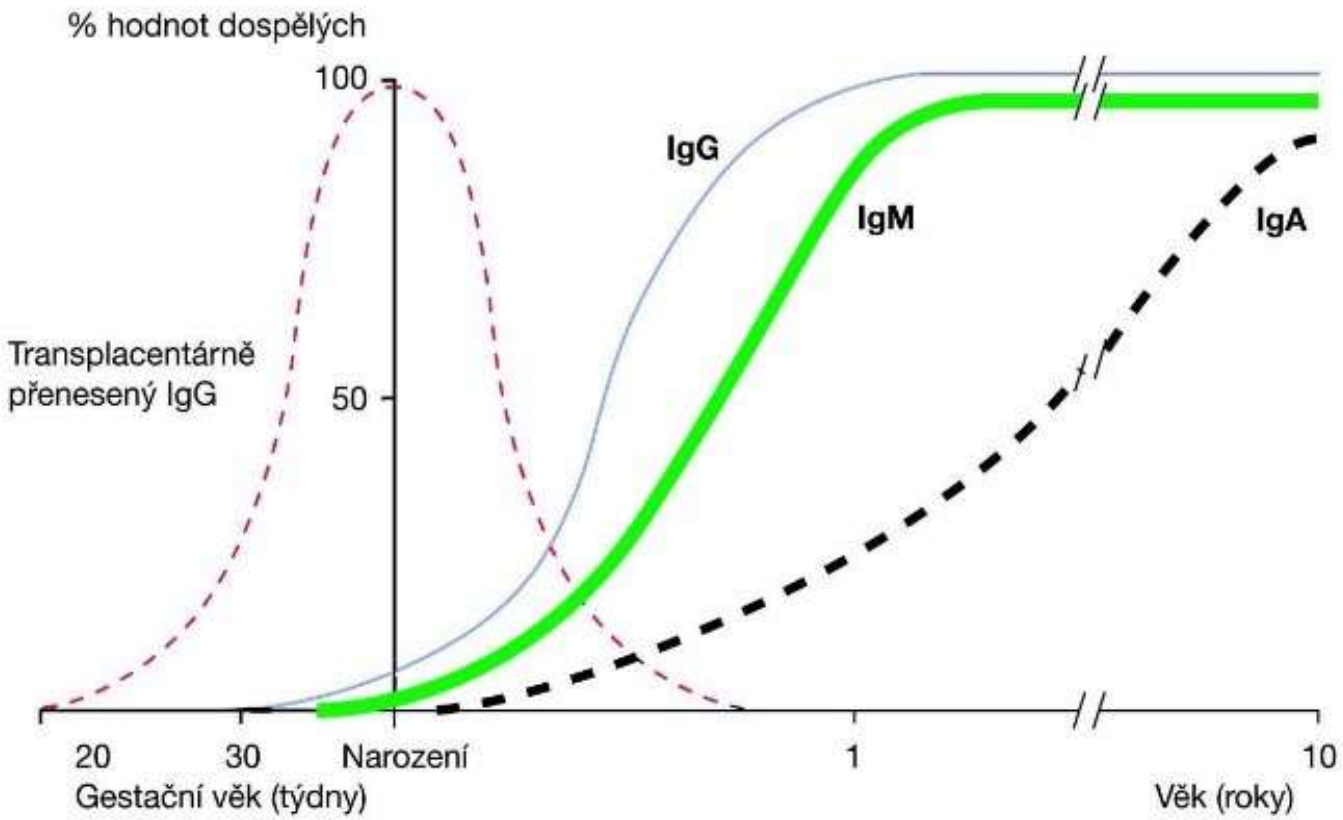
WILEY

Development of allergic immunity in early life

Clare M. Lloyd | Sejal Saglani

Summary

1 | INTRODUCTION



The Journal of Maternal-Fetal & Neonatal Medicine

Reference values of serum IgG and IgM levels in preterm and term newborns

Senem Alkan Ozdemir, Esra Arun Ozer, Sukran Kose, Ozkan Ilhan, Can Ozturk & Sumer Sutcuoglu

To cite this article: Senem Alkan Ozdemir, Esra Arun Ozer, Sukran Kose, Ozkan Ilhan, Can Ozturk & Sumer Sutcuoglu (2018) Reference values of serum IgG and IgM levels in preterm and term newborns, The Journal of Maternal-Fetal & Neonatal Medicine, 31:8, 973-976, DOI: 10.3109/14767058.2018.1027680

To link to this article: https://doi.org/10.3109/14767058.2018.1027680

Published online: 07 Apr 2018.

Terminologie

Donošený novorozenec ⇒ narozen > 37.g.t.

Nedonošený novorozenec ⇒ narozen < 37.g.t.

Velmi nedonošený novorozenec ⇒ narozen < 32.g.t.

Extrémně nedonošený novorozenec ⇒ narozen < 28.g.t.

Zdroj: https://www.who.int/pmnch/media/news/2012/201204borntoosoon-pressrelease_eng.pdf

Doporučení očkování nedonošených ČNeoS + ČSAKI r. 2018

Nedonošení >32.g.t. < 37 g.t. (nad 1500 g)
8 % živě narozených

Očkování v chronologickém věku 9 týdnů, schéma 3+1

Stejná pravidla jako u donošených

Velmi nedonošení <32. g.t. 1,2% živě narozených

Očkování zahájit nejdříve ve 4 – 6 měsících věku

- Infanrix Hib(di, te, pe, hemofilus b) nebo hexavalentní 3+1 (po 6. měsíci 2+1)
- Hepatitis B 3+1 (po 6. měsíci 2+1)
- Inaktivované Polio 3+1 (po 6. měsíci 2+1)
- Prevenar13 3+1, 14 dní po tetra nebo hexavakcině
- Meningokoky 3+1, 14 dní po tetra nebo hexavakcině
- Priorix 13-18 měsíců života
- BCG rizikové skupiny, po dosažení 2 000g
- HBsAg pozitivní matka podat Neohepatect a do 12 hod očkovat monovalentní HBV
- Rotaviry > 25 nebo > 27g.t. od 6 týdnů

Doporučení světová - nedonošení stejně jako donošení

REVIEW

Human Vaccines & Immunotherapeutics 11:11, 2556–2563; November 2015; © 2015 Taylor and Francis Group, LLC

Immunization of preterm infants

Arnaud Gagneur[1,*], Didier Pinquier[2], and Caroline Quach[3]

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Keywords: immunization, neonate, preterm, vaccines

Abbreviations: DTaP, diphtheria-tetanus-acellular pertussis vaccine; DTwP, diphtheria-tetanus-whole cell pertussis vaccine; Hib, Haemophilus influenzae type b; HBV, Hepatitis B; IPV, Inactivated polio vaccine; OPV, Oral polio vaccine; MenC, meningococcal group C conjugate vaccine; PCV, pneumococcal conjugate vaccine; MMR, measles-mumps-rubella; GMC, geometric mean concentration; GMT, geometric mean titer; GA, gestational age

Vaccinations of premature infants are often delayed despite being at an increased risk of contracting vaccine preventable diseases. This article reviews the current knowledge on the immune response to widely used vaccines, on the protection derived from routine immunization and on vaccine safety and tolerability in a population of preterm infants. Available data evaluating the immune response of preterm infants support early immunization without correction for gestational age. For a number of antigens, the antibody response to initial doses of vaccines may be lower than that of term infants, but protective concentrations are often achieved and memory successfully induced. Vaccines are immunogenic, safe and well tolerated in preterm infants. Preterm infants should be vaccinated using the same schedules as those usually recommended for full-term infants, with the exception of the hepatitis B vaccine, where additional doses should be administered in infants receiving the first dose during the first days of life if they weighed less than 2000 g because of a documented reduced immune response.

Introduction

More than 10% of infants are born prematurely and the rate of preterm births is increasing steadily worldwide.[1] Very preterm infants (<33 weeks of gestational age) represent 20% of all premature infants.[2] Immunocompetence in newborns depends on prenatal maturation as each additional week of gestation sees an increased response to antigens. Postnatal maturation, which begins upon exposure to environmental antigens, occurs in preterm infants at a speed comparable to that of full-term infants. Moreover, preterm infants have immunologic immaturities that may impact vaccine response particularly in very premature infants.[3]

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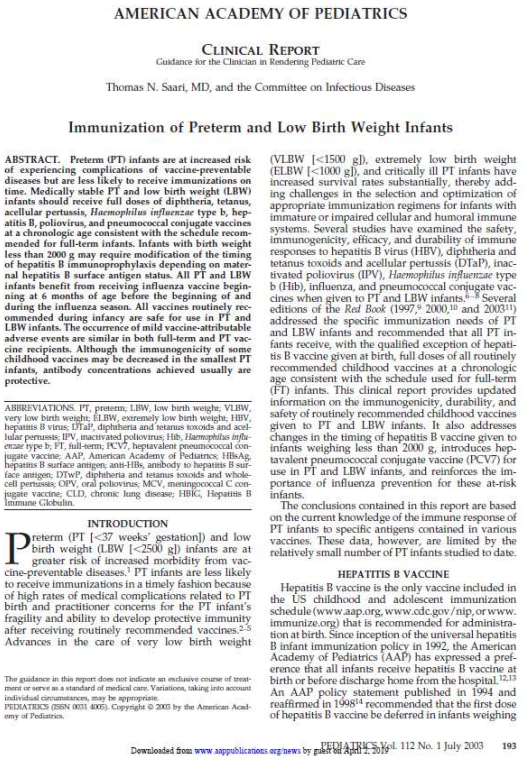
Submitted: 03/28/2015; Revised: 07/01/2015; Accepted: 07/14/2015
http://dx.doi.org/10.1080/21645515.2015.1074358

Preterm infants are at increased risk of infections in general and from vaccine preventable diseases in particular with increased incidence and severity.[4-6] Consequently, there is a need for timely vaccination of preterm infants, using the same schedules as recommended for full-term infants, without correcting for prematurity and regardless of birth weight.[3,7,8]

Vaccination is often delayed in preterm infants as demonstrated in a recent Italian study.[9] Lack of knowledge about safety and effectiveness of vaccines in preterm infants among healthcare workers and parents may explain this delay. Fear or adverse events could also explain this delay, as an increase in cardiorespiratory events following immunization in the very preterm was reported.[10-14] Accordingly, several recommendations were made to closely observe hospitalized extremely-low-birth-weight infants for significant adverse events for up to 72 hours.[3,7,8,15] This review focuses on the immunogenicity, safety and tolerability of currently used vaccines and the evidence pertaining to their use in preterm infants.

Premature Infants: Risk Factors for Vaccine Preventable Diseases

Over 50% of reported cases of pertussis occur in infants. Low birth weight infants are particularly at risk (RR 1.86; 95% CI 1.33 to 2.38) when compared to normal birth weight infants.[5] In a recent Australian prospective study, a history of prematurity (OR 5.00, CI 1.27–19.71) was independently associated with severe pertussis infections.[6] Invasive pneumococcal diseases account for up to 11% of neonatal sepsis. Preterm and low birth weight infants are at increased risk of pneumococcal disease compared to term infants. Comparing to normal birth weight and term infants, Shinefield et al. reported a risk ratio of 2.6 (p=0.03) and 9.1 for invasive pneumococcal diseases for low birth weight infants and preterm infants less than 32 weeks of gestation, respectively.[16] Preterm infants are also at higher risk for complications and hospitalization following rotavirus infections, compared to infants born at term.[17-19] Among children born preterm, those with a low (<2500 g) or very low birth weight (<1500 g) present the highest risk of rotavirus hospitalizations (OR: 2.6, 95 % CI: 1.6 – 4.1 and OR: 1.6; 95 % CI 1.3



AMERICAN ACADEMY OF PEDIATRICS

CLINICAL REPORT
Guidance for the Clinician in Rendering Pediatric Care

Thomas N. Saari, MD, and the Committee on Infectious Diseases

Immunization of Preterm and Low Birth Weight Infants

ABSTRACT. Preterm (PT) infants are at increased risk of experiencing complications of vaccine-preventable diseases but are less likely to receive immunizations on time. Medically stable PT and low birth weight (LBW) infants should receive full doses of diphtheria, tetanus, acellular pertussis, *Haemophilus influenzae* type b, hepatitis B, poliovirus, and pneumococcal conjugate vaccines at a chronologic age consistent with the schedule recommended for full-term infants. Infants with birth weight less than 2000 g may require modification of the timing of hepatitis B immunoprophylaxis depending on maternal hepatitis B surface antigen status. All PT and LBW infants benefit from receiving influenza vaccine beginning at 6 months of age before the beginning of and during the influenza season. All vaccines routinely recommended during infancy are safe for use in PT and LBW infants. The occurrence of mild vaccine-attributable adverse events are similar in both full-term and PT vaccine recipients. Although the immunogenicity of some childhood vaccines may be decreased in the smallest PT infants, antibody concentrations achieved usually are protective.

ABBREVIATIONS. PT, preterm; LBW, low birth weight; VLBW, very low birth weight; ELBW, extremely low birth weight; HBV, hepatitis B virus; DTaP, diphtheria and tetanus toxoids and acellular pertussis; IPV, inactivated poliovirus; Hib, *Haemophilus influenzae* type b; FT, full-term; PCV7, heptavalent pneumococcal conjugate vaccine; AAP, American Academy of Pediatrics; HBsAg, hepatitis B surface antigen; anti-HBs, antibody to hepatitis B surface antigen; DTwP, diphtheria and tetanus toxoids and whole-cell pertussis; OPV, oral poliovirus; MCV, meningococcal C conjugate vaccine; CLD, chronic lung disease; HBIG, Hepatitis B Immune Globulin.

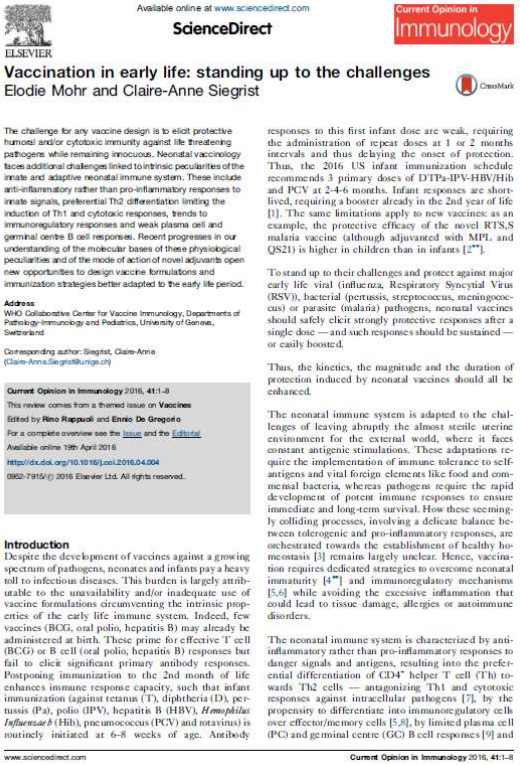
INTRODUCTION

Preterm (PT [<37 weeks' gestation]) and low birth weight (LBW [<2500 g]) infants are at greater risk of increased morbidity from vaccine-preventable diseases.[1] PT infants are less likely to receive immunizations in a timely fashion because of high rates of medical complications related to PT birth and practitioner concerns for the PT infant's fragility and ability to develop protective immunity after receiving routinely recommended vaccines.[2-5] Advances in the care of very low birth weight (VLBW [<1500 g]), extremely low birth weight (ELBW [<1000 g]), and critically ill PT infants have increased survival rates substantially, thereby adding challenges in the selection and optimization of appropriate immunization regimens for infants with immature or impaired cellular and humoral immune systems. Several studies have examined the safety, immunogenicity, efficacy, and durability of immune responses to hepatitis B virus (HBV), diphtheria and tetanus toxoids and acellular pertussis (DTaP), inactivated poliovirus (IPV), *Haemophilus influenzae* type b (Hib), influenza, and pneumococcal conjugate vaccines when given to PT and LBW infants.[6–8] Several editions of the *Red Book* (1997,[9] 2000,[10] and 2003[11]) addressed the specific immunization needs of PT and LBW infants and recommended that all PT infants receive, with the qualified exception of hepatitis B vaccine given at birth, full doses of all routinely recommended childhood vaccines at a chronologic age consistent with the schedule used for full-term (FT) infants. This clinical report provides updated information on the immunogenicity, durability, and safety of routinely recommended childhood vaccines given to PT and LBW infants. It also addresses changes in the timing of hepatitis B vaccine given to infants weighing less than 2000 g, introduces heptavalent pneumococcal conjugate vaccine (PCV7) for use in PT and LBW infants, and reinforces the importance of influenza prevention for these at-risk infants.

The conclusions contained in this report are based on the current knowledge of the immune response of PT infants to specific antigens contained in various vaccines. These data, however, are limited by the relatively small number of PT infants studied to date.

HEPATITIS B VACCINE

Hepatitis B vaccine is the only vaccine included in the US childhood and adolescent immunization schedule (www.aap.org, www.cdc.gov/nip, or www.immunize.org) that is recommended for administration at birth. Since inception of the universal hepatitis B infant immunization policy in 1992, the American Academy of Pediatrics (AAP) has expressed a preference that all infants receive hepatitis B vaccine at birth or before discharge home from the hospital.[12,13] An AAP policy statement published in 1994 and reaffirmed in 1998[14] recommended that the first dose of hepatitis B vaccine be deferred in infants weighing



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Current Opinion in Immunology

ELSEVIER

Vaccination in early life: standing up to the challenges

Elodie Mohr and Claire-Anne Siegrist

The challenge for any vaccine design is to elicit protective humoral and/or cytotoxic immunity against life threatening pathogens while remaining innocuous. Neonatal vaccinology faces additional challenges linked to intrinsic peculiarities of the innate and adaptive neonatal immune system. These include anti-inflammatory rather than pro-inflammatory responses to innate signals, preferential Th2 differentiation limiting the induction of Th1 and cytotoxic responses, trends to immunoregulatory responses and weak plasma cell and germinal centre B cell responses. Recent progresses in our understanding of the molecular bases of these physiological peculiarities and of the mode of action of novel adjuvants open new opportunities to design vaccine formulations and immunization strategies better adapted to the early life period.

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Current Opinion in Immunology 2016, **41**:1–8
This review comes from a themed issue on **Vaccines**
Edited by **Rino Rappuoli** and **Ennio De Gregorio**
For a complete overview see the Issue and the Editorial
Available online 19th April 2016
http://dx.doi.org/10.1016/j.coi.2016.04.004
0952-7915/

Introduction

Despite the development of vaccines against a growing spectrum of pathogens, neonates and infants pay a heavy toll to infectious diseases. This burden is largely attributable to the unavailability and/or inadequate use of vaccine formulations circumventing the intrinsic properties of the early life immune system. Indeed, few vaccines (BCG, oral polio, hepatitis B) may already be administered at birth. These prime for effective T cell (BCG) or B cell (oral polio, hepatitis B) responses but fail to elicit significant primary antibody responses. Postponing immunization to the 2nd month of life enhances immune response capacity, such that infant immunization (against tetanus (T), diphtheria (D), pertussis (Pa), polio (IPV), hepatitis B (HBV), *Hemophilus Influenzae b* (Hib), pneumococcus (PCV) and rotavirus) is routinely initiated at 6–8 weeks of age. Antibody responses to this first infant dose are weak, requiring the administration of repeat doses at 1 or 2 months intervals and thus delaying the onset of protection. Thus, the 2016 US infant immunization schedule recommends 3 primary doses of DTPa-IPV-HBV/Hib and PCV at 2-4-6 months. Infant responses are short-lived, requiring a booster already in the 2nd year of life [1]. The same limitations apply to new vaccines: as an example, the protective efficacy of the novel RTS,S malaria vaccine (although adjuvanted with MPL and QS21) is higher in children than in infants [2••].

To stand up to their challenges and protect against major early life viral (influenza, Respiratory Syncytial Virus (RSV)), bacterial (pertussis, streptococcus, meningococcus) or parasite (malaria) pathogens, neonatal vaccines should safely elicit strongly protective responses after a single dose — and such responses should be sustained — or easily boosted.

Thus, the kinetics, the magnitude and the duration of protection induced by neonatal vaccines should all be enhanced.

The neonatal immune system is adapted to the challenges of leaving abruptly the almost sterile uterine environment for the external world, where it faces constant antigenic stimulations. These adaptations require the implementation of immune tolerance to self-antigens and vital foreign elements like food and commensal bacteria, whereas pathogens require the rapid development of potent immune responses to ensure immediate and long-term survival. How these seemingly colliding processes, involving a delicate balance between tolerogenic and pro-inflammatory responses, are orchestrated towards the establishment of healthy homeostasis [3] remains largely unclear. Hence, vaccination requires dedicated strategies to overcome neonatal immunativity [4••] and immunoregulatory mechanisms [5,6] while avoiding the excessive inflammation that could lead to tissue damage, allergies or autoimmune disorders.

The neonatal immune system is characterized by anti-inflammatory rather than pro-inflammatory responses to danger signals and antigens, resulting into the preferential differentiation of CD4+ helper T cell (Th) towards Th2 cells — antagonizing Th1 and cytotoxic responses against intracellular pathogens [7], by the propensity to differentiate into immunoregulatory cells over effector/memory cells [5,8], by limited plasma cell (PC) and germinal centre (GC) B cell responses [9] and

Kontraindikace očkování - světová doporučení

- anafylaxe po vakcíně
- težká porucha mozku vzniklá do 7 dnů po očkování (pertuse)
- akutní nestabilní neurologické onemocnění (pertuse)
- živé vakcíny - těžký imunodeficit

CURRENT OPINION
Drug Safety 2006; 29 (9): 743-752
0114-5916/06/0009-0743/$34.95/0

When Should Vaccination Be Contraindicated in Children?

Laura Lane,[1] *Arlene Reynolds*[2] and *Mary Ramsay*[1]

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Abstract

No child should be denied immunisation without serious consideration given to the consequences. In the past, many contraindications to vaccination were based on theoretical concerns. These concerns often assumed an immunoallergic mechanism for adverse reactions, whereas many such events are often due to other causes. Other contraindications were based on evidence of excess risk, but this risk was not always balanced against the higher risk of disease. Therefore, contraindications often varied between countries and over time.

In recent years, the widespread availability of less reactogenic vaccines and the common use of combined preparations have prompted a review of contraindications in many countries. Accumulated experience worldwide has allowed the list of conditions that contraindicate vaccination to be reduced. The international consensus now is that there are very few situations in which a child should not be immunised and the only true contraindication applicable to all vaccines is a history of anaphylaxis to a vaccine component or following a previous dose of the vaccine. Health professionals should feel confident in accepting national recommendations and, if in doubt, should refer children for an expert opinion, rather than deny a child protection against a serious infection.

There are very few situations in which a child should not be immunised. Although contraindications to immunisation vary according to national policy, there is a consensus that the only true contraindication applicable to all vaccines is a history of anaphylaxis to a vaccine component or following a previous dose of the vaccine (table I).[1-4] There are other situations in which vaccination is not contraindicated but in which a clinical judgement is needed before vaccination can proceed. Such precautions require an assessment of the potential benefits and risks of vaccination to the individual and may result in a temporary deferral or in offering immunisation under controlled circumstances.

Contraindications and precautions are often confused. Historically, many false contraindications have been passed from practitioner to practitioner, resulting in children being unnecessarily denied immunisation without serious consideration of the long-term implications, both for the child and for the community. Vaccine providers often have substantial knowledge gaps about contraindications and vaccines are frequently not given because of misconceptions about what truly contraindicates a vaccine.[6,7] As more becomes known about the safety and efficacy of each vaccine and the individual patient's reactions and responses to them, many previous recommendations about when and to whom vaccines should not be given are being reconsidered by experts and advisory groups.

The purpose of this review is to discuss the rationale for past and current contraindications, the

Allergol Immunopathol (Madr). 2018;46(1):99–104

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POINT OF VIEW

True and false contraindications to vaccines

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Received 15 January 2017; accepted 18 February 2017
Available online 8 May 2017

KEYWORDS
Vaccine;
Adverse event;
Anaphylaxis;
Child;
Contraindication;
Precaution;
Management;
Risk;
Recommendations;
Health-care

Abstract Nowadays, the awareness of risks related to infectious diseases has decreased, whereas THE perception of risks related to vaccination is growing. Therefore, it may be difficult for health care providers to convince people of the importance of vaccination and adherence to the immunisation schedule.

Selected situations that might raise uncertainties about vaccine recommendations are discussed in order to help health care providers to identify real and perceived contraindications to vaccines, and cases to be referred to specialised pre-vaccination consultation due to an increased risk of adverse events to vaccines.

Introduction

Nowadays, the incidence of several infectious diseases and, consequently, awareness of infection-related risks has decreased notably, whereas the perception of risks related

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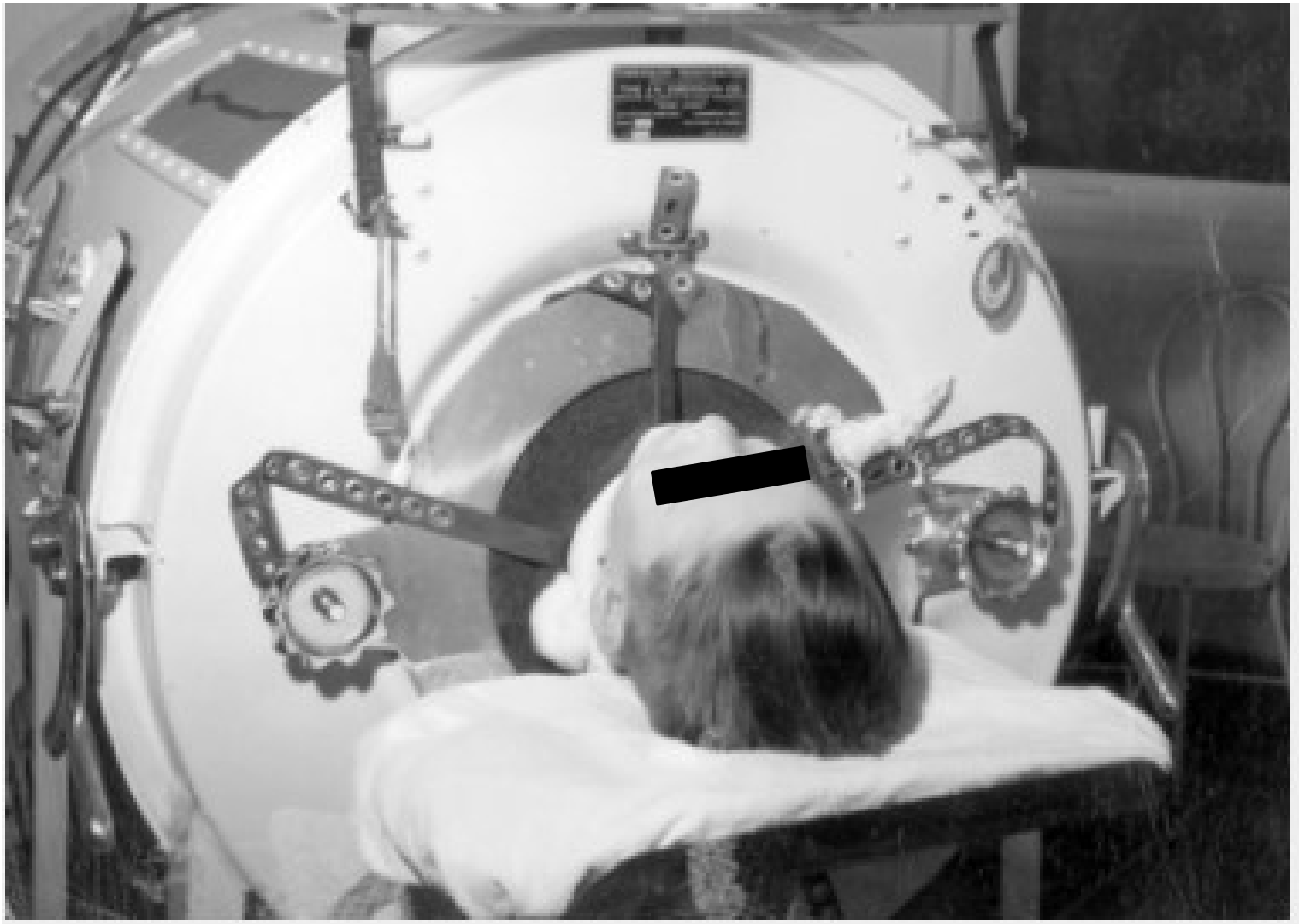
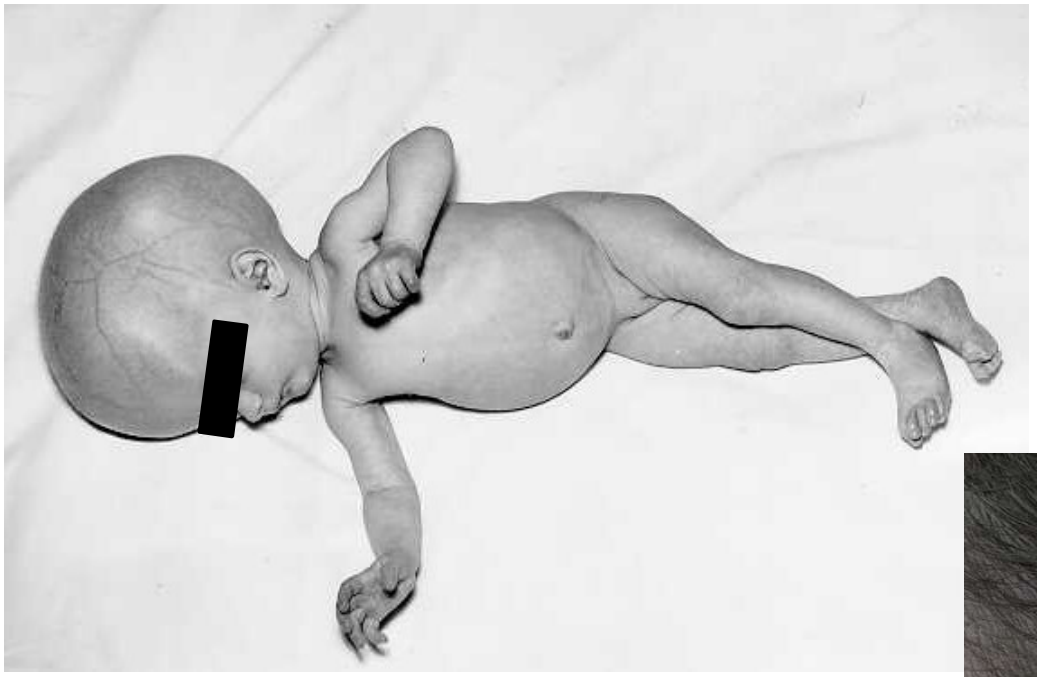
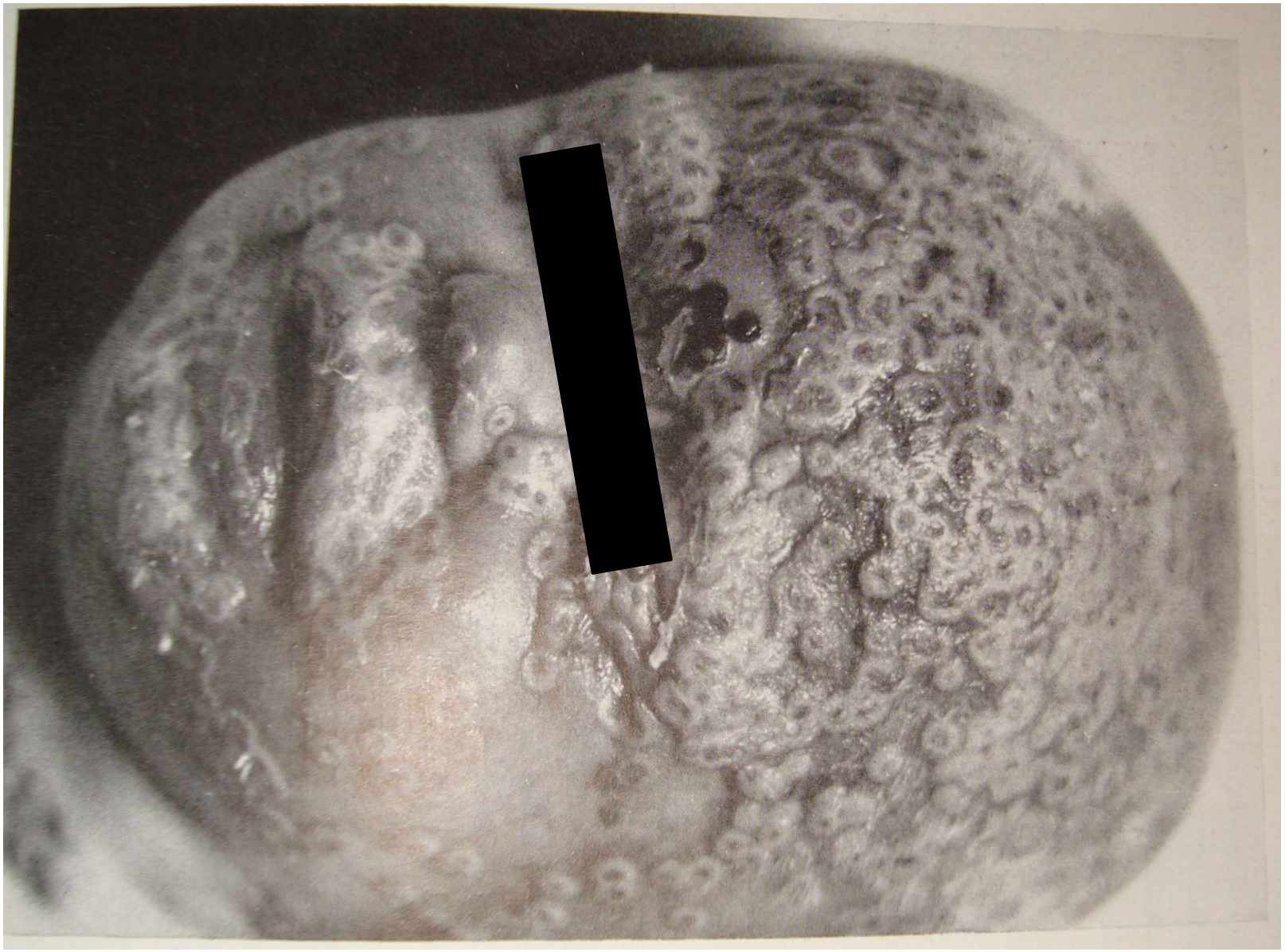
1 These authors equally contributed as first authors to the review.

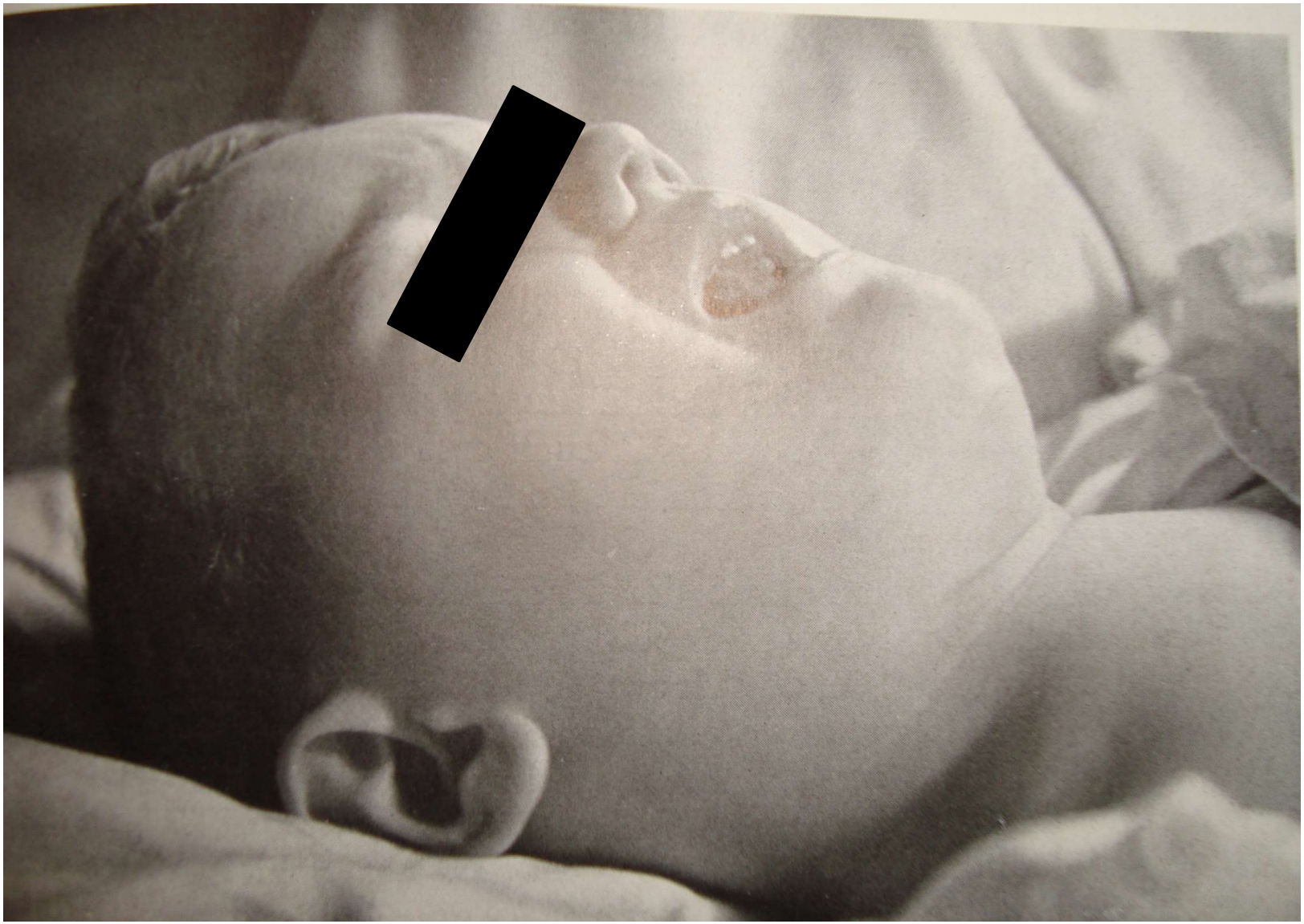
https://doi.org/10.1016/j.aller.2017.02.003
0301-0546/© 2017 Published by Elsevier España, S.L.U. on behalf of SEICAP.




SALK'S VACCINE
WORKS!
POLIO







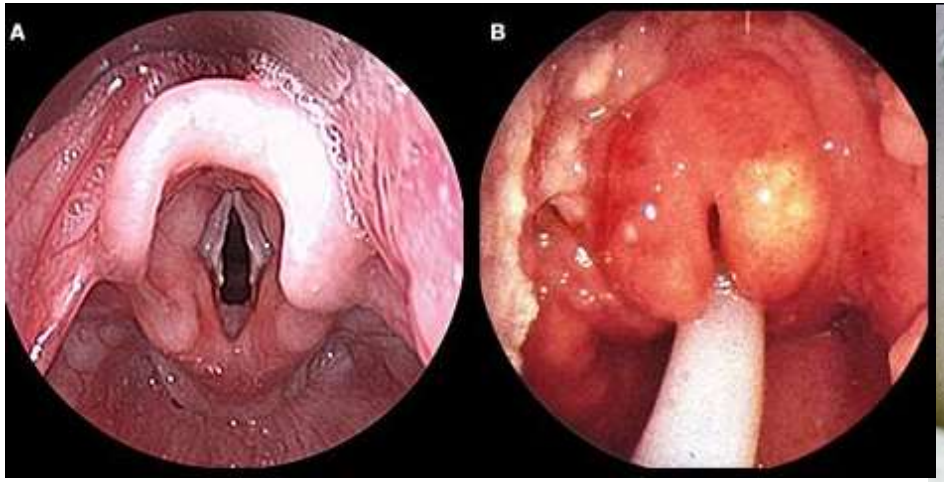
Paul de Kruif: Lovci mikrobů

VIII. vydání 1939

Bylo to s počátku roku 1880 a tehdy právě neobyčejně zle řádil záškrt – záškrt, který, jak se zdá, v každých sto letech několikrát vystřídá stoupající a klesající křivku své vražedné vášně…….

Marné bylo hořekovaní ošetřovatelů nemocných dětí v nemocnicích , smutkem zlomených. Ozývalo se tam chrčivé kašlání, předzvěst udušení, v truchlivých řadách na úzkých postýlkách ležely bílé polštářky a na nich jako v rámečcích se rýsovaly drobné obličeje, modré, protože jakási neznámá ruka je škrtila pevným sevřením…….

Z deseti obyvatelů těchto lůžek jich bylo pět posíláno do márnice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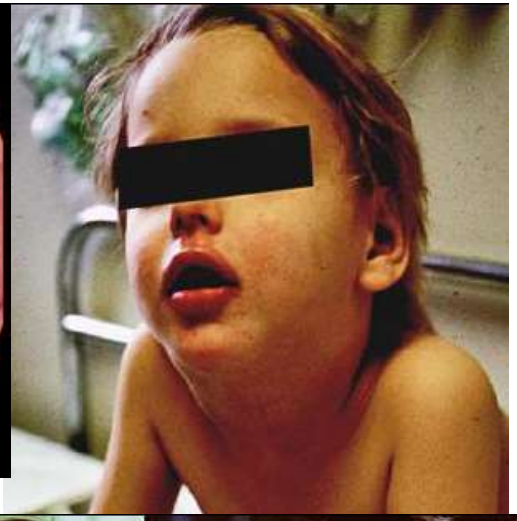

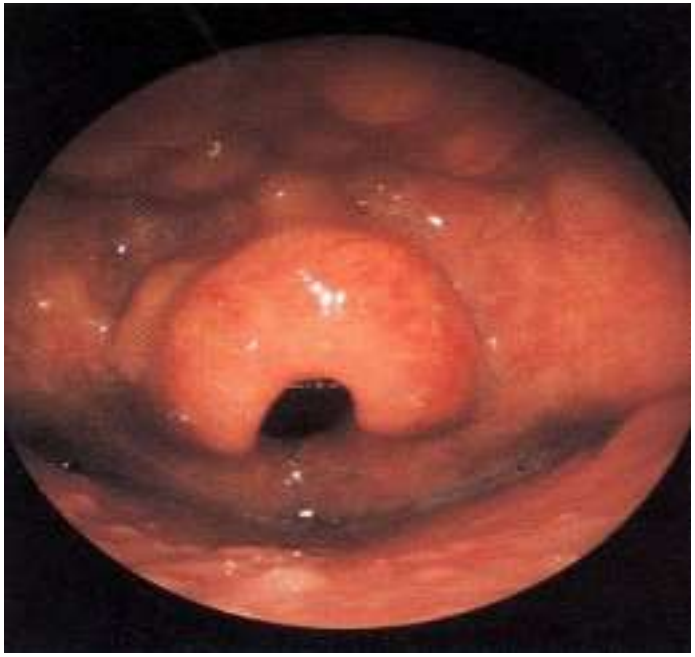

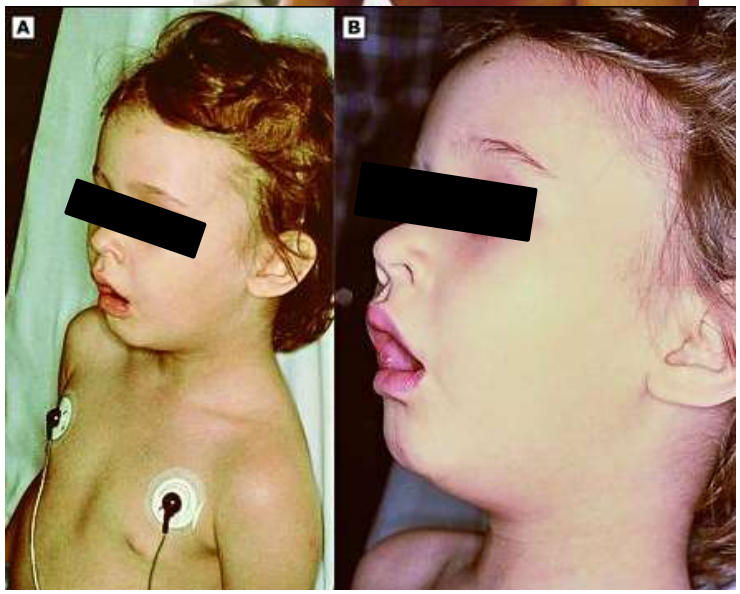
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Děkuji za pozornost