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2nd Edition

OSCE in Pediatrics



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Foreword
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Contents

Chapter 01	Connective Tissue	1
Chapter 02	Counseling, History and Examination	10
Chapter 03	Drugs and Vaccines	32
Chapter 04	Endocrinology	46
Chapter 05	Genetics	61
Chapter 06	Gastrointestinal Disorders	80
Chapter 07	Hematology and Oncology	92
Chapter 08	Infection	121
Chapter 09	Neurology	143
Chapter 10	Neonatal Advanced Life Support and Pediatric Advanced Life Support	158
Chapter 11	Community Medicine	165
Chapter 12	Respiratory System	175
Chapter 13	Statistics	195
Chapter 14	Miscellaneous	206
Chapter 15	Cardiovascular System	222
Chapter 16	Growth, Development and Nutrition	239
Chapter 17	Neonatology	253
Chapter 18	Radiology	284
Chapter 19	Renal System	310
Chapter 20	Orthopedics	322
Chapter 21	Device and Equipments	328
Chapter 22	Ophthalmology/Eye	338

Chapter

3

Drugs and Vaccines

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QUESTIONS

Q1.



a. What is the usage of above drug?
b. What is the preferred route of administration?
c. What is the dose?
d. What is the minimum safe age?
e. What is the limitation?

Q2.



a. What is the usage of above drug?
b. What is the preferred route of administration?
c. What is the dose?
d. What is the minimum safe age?

Q3. A mother was worried that her newborn baby did not receive polio drops along with BCG before discharge from hospital.

a. What is the role of zero dose polio?
b. What is the content of oral polio vaccine per dose?
c. Unlike other live vaccines which are administered as single doses, why multiple dose of OPV are recommended?
d. What specific instruction has to be given to the mother after OPV administration?

Q4. DRUG: METHYLENE BLUE.

a. Name two conditions where it can be used.
b. Name two contraindications for its use.
c. What is the color of urine when a patient is given methylene blue?

Q5. DRUG: PARACETAMOL.

a. What are the indications for its usage? Name the different routes and dose to be given.
b. How frequently can you give this drug and what is the maximum dose limit?
c. What can be done to prevent toxicity?
d. What is the antidote for paracetamol toxicity? What dose of the antidote should be given?

Q6. Answer the following questions.

a. What vaccination schedule would you offer to a newborn baby born to a HbsAg +ve mother and when?
b. Which vaccine would you advise a thalassemic patient who is undergoing a splenectomy?
c. What is the minimum duration advised between vaccination and splenectomy?
d. Write the vaccination schedule for a person who has been bitten by a dog 3 hours back. The patient had been bitten by the same animal 1 year back and has received a full course of vaccinations at that time.

Q7. DRUG: ADRENALINE.

a. What is the strength (in terms of mg/mL) of the commercially available adrenaline ampoule?
b. What are the indications for its usage in NRP?
c. Name the route and dose to be given in NRP.
d. How frequently can it be given?
e. Give 3 noncardiac uses of this drug.
f. Give 3 cardiac and 3 noncardiac side effects of this drug.
g. Give 3 conditions where use of adrenaline is relatively contraindicated.

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Q8. DRUG: AMPHOTERICIN B.

a. Mention one indication other than as an antifungal agent.
b. What is the maximum IV dose (mg/kg/day)?
c. Amphotericin B can be gives through oral route. Write true/false.
d. Most common side affect of amphotericin B therapy (name the system affected).
e. Which of the following is ***not*** the side effect of amphotericin B?
   i. Hypokalemia
   ii. Hyperkalemia
   iii. Hypomagnesemia
   iv. Hypermagnesemia.

Q9. RABIES VACCINE.

a. A pet vaccinated dog has bitten a child on his left leg. In this incident, the child got an abrasion of 1.5 cm with slight oozing of blood. What class of rabies exposure is this?
b. Which of the following is most essential in rabies postexposure prophylaxis?
   1. Local wound irrigation with soap and water.
   2. Antirabies vaccination.
   3. Rabies immunoglobulin administration.
   4. Observation of dog.
c. What is dose and route of equine rabies immunoglobulin administration?
d. A five-year-old child has received full postexposure prophylaxis for rabies 3 years back. Now this child has been bitten by stray dog and got class III bite. Which schedule will you use?

Q10. DRUG: INDOMETHACIN.

a. Write the dose and schedule of indomethacin given for the closure of PDA in a newborn who is less than 48 hours old.
b. Name another condition which can be prevented by administration of indomethacin in a preterm newborn.
c. Mention four main contraindications to the use of indomethacin.

Q11. DRUG: SODIUM NITROPRUSSIDE.

a. What is the indication for the use of sodium nitroprusside?
b. What is its mechanism of action?
c. What two specific precautions will you take while administering it?

Q12. Match the drug with the organism against which it is most effective.

a. Ceftazidime	1. *Mycoplasma*
b. Cotrimoxazole	2. *Pneumocystis carinii*
c. Crystalline penicillin	3. *Cl. difficile*
d. Vancomycin	4. *Pseudomonas*
e. Clarithromycin	5. *C. diphtheriae*

Q13. Answer the following questions with regard to storage of vaccines.

a. What is a cold chain?
b. What is a vaccine carrier?

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c. How long can you keep vaccines in a vaccine carrier?
d. What are the other factors which damage vaccines?

Q14. DRUG: IVIG.

a. What is the dose for management of acute idiopathic thrombocytopenia with intracranial bleed?
b. What are the adverse effects? (Give at least 4)
c. Name 2 other alternative drugs in management of acute ITP with significant bleeds?

Q15. List two absolute and two relative contraindications to the use of DTP vaccine.

Q16. Answer the following questions.

a. What is lyophilization?
b. Name 3 lyophilized vaccines.

Q 17. CHICKENPOX VACCINE.

a. What is the dose and strain of the vaccine?
b. Above what age are 2 doses recommended and at what intervals?
c. For postexposure prophylaxis within what period after exposure, should the vaccine be administered?
d. How long can the vaccine be used after reconstitution?
e. What is the indication for giving varicella zoster immunoglobulin in newborn?
f. What is the route of administration for the vaccine and immunoglobulin?

Q18. MANTOUX SKIN TEST.

a. What is the composition of tuberculin used?
b. After what duration does it become reactive following TB infection?
c. Mention 4 host-related factors, which can depress the skin test in a child infected with *Mycobacterium tuberculosis*.
d. When can a tuberculin reaction of $\geq$ 5 mm be taken as positive? (Mention 2 conditions).

Q19. A baby born to a HBsAg positive mother receives HBIG and HBV soon after delivery and at 1 and 6 months.

a.
   i. When would you recommend postvaccination testing for HBsAg and anti-HBS?
   ii. How would you interpret the results?
      - anti-HBs positive, HBsAg negative.
      - anti-HBs and HBsAg negative.
      - anti-HBs negative, HBsAg positive.

b. What is the strength of the HBV vaccine used at different ages and for the immune suppressed?
c. What would be the vaccination schedule for a 2-year-old child who has received only two doses of HBV vaccine at 1½ and 2½ months of age?

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d. A 15-months-old child due for MMR has missed HBV vaccine in infancy. What would be your advice?

Q20. A 1½-years-old child is admitted and treated for HAV infection. Child has not received any immunization so far as he comes from a tribal area.

a. What will be the immunizations you would advise for this child and at what schedule?
b. Is HAV vaccine required for this child?

Q21. STORAGE OF VACCINES.

Vaccines are stored in the refrigerator in your clinic. Mention the correct place of storage of the following:

a. BCG
b. OPV
c. Measles
d. DPT/DT/TT
e. Varicella
f. Hepatitis-B
g. Hepatitis-A
h. Typhoid
i. Diluent
j. Ice cubes
k. Ice packs
l. Dial thermometer
m. Water bottles

Q22. UIP.

a. What are the objectives of UIP other than the immunization?
b. Name the vaccines used in UIP.
c. What are the immunization targets in the UIP?

Q23. A 5-year-old boy is brought to pediatric emergency room by his father after being struck by a car. Examination shows a lethargic but responsive child with a large frontal hematoma and bilateral hemotympanum. No other injuries are identified. A computed tomography (CT) scans of the head without contrast is ordered. The child becomes very agitated and frightened when taken to the CT scanner.

a. Which one of the following drugs would you prefer to sedate this child for CT scan of head?
   - Ketamine.
   - Midazolam.
   - Fentanyl.
   - Triclophos.
b. What is the dose of the drug used for this purpose?
c. What is the dose of midazolam if used intranasally in children <12 years old?

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Q24. An 8-year-old child gets a road side injuries with abrasions on the left knee with dirt on that. Child has received full vaccination including DPT/OPV second booster at 5 years of age. Mother wants to know regarding needs to tetanus toxoid vaccination (TT) at present.

a. What will be the most appropriate advice?
   i. No need to give TT at present.
   ii. Give TT one dose.
   iii. Give TT along with tetanus immunoglobulin.
   iv. Give three doses of TT at 0,1 and 6 months.
b. What is the schedule of boosters for TT?
c. What is the content of toxoid in single dose of TT?

Q25. Answer the following questions.

a. Name five drugs/poison which can cause miosis in the child.
b. Which of the following is used as an antidote for acute INH toxicity?
   i. N-acetyl cysteine.
   ii. Pralidoxime.
   iii. Pyridoxine.
   iv. Physostigmine.
c. What is the antidote for heparin?

Q26. A 5-years-old boy diagnosed as a case of steroid-resistant nephrotic syndrome presents to your OPD for further workup and management. He has already developed some features of steroid toxicity. You want to start him on cyclosporine.

a. What is the dose of cyclosporine in this scenario?
b. What are the common adverse effects? (at least 4)
c. Name one drug that inhibits hepatic metabolism of cyclosporine leading to toxicity?

Q27. DRUG : CALCIUM GLUCONATE.

a. What is the strength of elemental calcium in the commonly available preparation?
b. Mention any 3 uses of this drug.
c. Mention 3 side effects of this drug.
d. What is the dose in treatment of hypocalcemic crisis?
e. Mention 3 important treatment options for hypercalcemia.

Q28. DRUG : VITAMIN K_1 oxide.

a. Give the pharmacological names of vitamin K_1, K_2, K_3.
b. Name vitamin K dependent coagulation factors.
c. Give 2 tests to diagnose deficiency of vitamin K.
d. Define early, classical and late hemorrhagic disease of newborn.

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Q29. Match the following:

Type of antigen	*Examples*
• Live bacteria, attenuated	OPV, MMR, varicella
• Live virus, attenuated	HBsAg
• Inactivated bacteria	BCG, Ty 21a
• Inactivated virus	Acellular pertussis
• Toxoid	IPV, rabies, HAV
• Capsular polysaccharide	DT, TT, Td
• Viral subunit	Pertussis, whole cell killed typhoid
• Bacterial subunit	Typhoid Vi, Hib, meningococcal, pneumococcal

Q30. DRUG: KETAMINE.

a. What is the dose for anesthesia for short procedure?
b. What are the adverse effects? (At least 4) .
c. What type of anesthesia does it cause and which part of the brain does the drug act on?

Q31. Answer the following questions.

a. What is GAIN?
b. For AFP surveillance a rate of >1/100,000 population in children aged less than 15 years is the best indicator for good surveillance system (true/false).
c. Palivizumab (monoclonal antibody) is used to treat infection with which virus?

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ANSWERS

A 1:

- Immunization to prevent invasive meningococcal disease caused by
- *N meningitidis* serogroups A, C, Y and W-135
- Intramuscular injections
- 0.5 ML
- 9 months (in case of outbreaks; usually given after 2 year age)
- Menactra vaccine does not prevent *N meningitidis* serogroup B disease.

A 2:

1. GARDASIL is a human papilloma virus (HPV) vaccine that helps protect against 4 types of HPV- type 6,11,16,18.
2. Intramuscular injection
3. 0.5 mL GARDASIL should be administered in 3 separate occasions over 6 months (0, 2, 6 months)
4. 9 years.

A 3:

a.
   - Uptake is said to be better in neonatal period as there is no gut flora to interfere.
   - Transplacental transfer of maternal antibodies against poliomyelitis does not interfere with the seroconversion.
   - As it is the first contact period between the baby and the health care provider, it enables logistic ease of administration.

b. Each dose of OPV contains:
   Type 1: 3 lacs TCID50
   Type 2: 1 lacs TCID50
   Type 3: 3 lacs TCID50 *(Park's Textbook of PSM)*

c. Multiple doses of OPV are needed for satisfactory seroconversion. The seroconversion with OPV is affected by poor antigenicity of the vaccine, thermal lability requiring stringent cold chain maintenance and interference by enteroviruses in the gut for proper uptake of the oral vaccine. Each time only one subtype of polio virus can cause antigenicity, hence more doses are required.

d. The mother need not be given any specific instructions after OPV, except that she has to report for subsequent immunizations regularly.

A 4:

a. Antidote for cyanide poisoning and for drug-induced methemoglobinemia.
b. Avoid in G6PD deficiency and in renal insufficiency.
c. Urine and feces turn blue-green.

A 5:

a. Analgesic and antipyretic. Oral/rectal; dose 10–15 mg/kg/dose. Intramuscular dose—5 mg/kg/dose.

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b. 4–6 hourly; 1 g/dose or 60–90 mg/kg/day.
c. Toxicity is described with chronic usage in normal range. If chronic use is required, consider reducing dose to lower end of the range.
d. N-acetyl cysteine. 150 mg/kg IV over 15 minutes followed by 50 mg/kg IV over next 4 hours then 100 mg/kg IV over next 16 hours.

A 6:

a. HBIG and hepatitis B vaccine to be given within 24 hours of birth at different sites, followed by hepatitis B vaccination at 6 and 14 weeks or at birth, 6 weeks and 6 months. If HBIG is not available, HB vaccine may be given at 0, 1, and 2 months with an additional dose between 9–12 months.
b. Hib, pneumococcal, meningococcal, typhoid.
c. 2 weeks.
d. 2 doses of the vaccine are recommended on day 0 and 3 only. Antirabies antibody titers > 0.5 IU/mL are considered protective.

A 7:

a. 1 mg/mL (1:1000 preparation).
b. Heart rate below 60 despite 30 seconds of effective ventilation and chest compression.
c. IV (0.1–0.3 mL/kg/dose of 1:10,000 dilution) and intratracheal (0.3–1 mL/kg/dose of 1:10,000 solution).
d. 3 to 5 minutes.
e. Used in anaphylaxis, bronchial asthma, securing hemostasis and in some cases of hypoglycemia.
f. Cardiac—palpitations, arrhythmias, hypertension.
Noncardiac—pallor, tremors, headache.
g. Hypertension, hyperthyroidism, patients of angina, during anesthesia with halothane and to patients on beta blockers.

A 8:

a. Leishmaniasis/*Echinococcus multilocularis*.
b. 1.2 mg/kg/day.
c. True.
d. Renal.
e. Hypermagnesemia.

A 9:

a. Class III.
b. Local wound irrigation with soap and water.
c. 40 IU/kg, 100% at wound site if possible.
d. Only 2 doses at day 0 and day 3.

A 10:

a. 200 microgram stat followed by 100 microgram followed by 100 microgram at 12 to 24 hours interval.
b. Intracranial hemorrhage.
c. Poor renal function, thrombocytopenia, NEC, sepsis.

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A 11:

a. Hypertensive crisis.
b. Vasodilator.
c. Protect the IV tubing from light and discard if color changes from pale orange to dark brown or blue.

A 12:

a. Ceftazidime	*Pseudomonas*
b. Cotrimoxazole	*Pneumocystis carinii*
c. Crystalline penicillin	*C. diphtheria*
d. Vancomycin	*Cl. difficile*
e. Clarithromycin	*Mycoplasma*

A 13:

a. It is a system of transporting, distributing and storing vaccines under refrigeration using any convenient methods, from the manufacturer right up to the point of use.
b. A vaccine carrier is a thick-walled, insulated box with a tight lid with removable ice packs, used for carrying small quantities of vaccines to the peripheral clinics and fields for use.
c. Vaccines can be kept safely in the desired temperature, generally for 1 working day in vaccine carriers.
d. Heat, sunlight and freezing are other factors which damage vaccines.

A 14:

a. 0.8–1 g/kg/day × 2 days.
b. Nausea, vomiting, headache, allergic reaction, renal failure, blood transmittable disease, anaphylaxis in IgA deficient individuals.
c. Prednisolone, methyl prednisolone, dexamethasone, anti-D, dapsone.

A 15:

a. Absolute—encephalopathy, anaphylaxis.
b. Relative.
   i. Temperature of >40.5°C or more within 48 hours.
   ii. Collapse or shock like state present within 48 hours.
   iii. Persistent or inconsolable cry lasting 3 hours or more within 48 hours.
   iv. Convulsions within 3 days, with or without fever.

A 16:

a. Live vaccines in powder form (freeze-dried) requiring reconstitution before usage.
b. Measles, BCG, MMR and oral typhoid vaccine.

A 17:

a. 0.5 mL; live attenuated vaccine from Oka strain.
b. After 13 years (at 4–8 weeks interval).
c. Within 72 hours (3–5 days).
d. 30 minutes (should be protected from light and heat).
e. If mother develops varicella 5 days before to 2 days after delivery.
f. Vaccine-subcutaneous ; VZIG-intramuscularly.

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A 18:

a. 0.1 mL contains 1 TU of PPD stabilized with tween 80.
b. 3 weeks to 3 months (most often between 4–8 weeks).
c. i. Malnutrition.
   ii. Immune suppression by measles, mumps, varicella, influenza.
   iii. Vaccination with live virus vaccine.
   iv. Immunosuppression by drugs.
d. i. Disseminated TB/military TB.
   ii. Children with immunosuppressive conditions—HIV/organ transplantation or on corticosteroids > 15 mg/24 hours for > 1 month.
   iii. Malnutrition.

A 19:

a.
   i. 9–15 months of age.
   ii.
      1. If positive for anti-HBS—immune to HBV.
      2. If negative for HBsAg and anti-HBS—give a second complete HBV series of vaccination followed by retesting.
      3. If positive for HBsAg the parent should be counselled.
b.
   - 0–10 years — 0.5 mL or 10 microgram
   - >10 years — 1 mL or 20 microgram
   - Immunosuppressed — 2 mL or 40 microgram

c. Give only one dose of HBV to complete the schedule.
d. To start HBV vaccination and administer the 1st dose simultaneously with MMR at a different site.

A 20:

a. As many vaccines as possible can be administered to this child simultaneously following the IAP schedule and administering optional vaccines as per the mother's request
b. No need for HAV vaccine.

A 21:

a. Top shelf.
b. Freezing compartment.
c. Top shelf .
d. Middle shelf.
e. Middle shelf.
f. Middle shelf.
g. Middle shelf.
h. Middle shelf.
i. Lower shelf.
j. Freezer.
k. Freezer.
l. Top shelf.
m. Side door.

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A 22:

a. Objectives:
   i. Self-sufficiency in vaccine production.
   ii. Establishment of a functional cold chain system.
   iii. Introduction of district level monitoring.
b. BCG, DTP, OPV and measles for infants and TT for pregnant women.
c. Target:
   - BCG, OPV, DPT and measles in age <1st year and TT in pregnant women.
   - 100% coverage for pregnant women and at least 85% for infants.

A 23:

a. Midazolam.
b. For sedation—IV loading dose of 0.05–0.2 mg/kg, then either same dose q 1–2 hour or continuous infusion of 1–2 microgram/kg/min.
c. 2.5 mg (0.5 mL) in each naris (total 5 mg) using 5 mg/mL injection.

A 24:

a. No need of TT at present.
b. Boosters may be given at 10 and 16 years and thereafter every 10 years.
c. 5LF.

A 25:

a.
   i. Opioids.
   ii. Phenothiazines.
   iii. Organophosphates.
   iv. Carbamates.
   v. Pralidoxime.
b. Pyridoxine.
c. Protamine.

A 26:

a. 3–6 mg/kg/day q 12 hourly.
b. Hypertension, hirsutism, tremors, nephrotoxicity, gingival hypertrophy, seizure, headache, acne, leg cramps, GI discomfort.
c. Erythromycin, ketoconazole, fluconazole, verapamil, metoclopramide.

A 27:

a. 10% calcium gluconate.
   1 mL of 10% calcium gluconate = 9 mg (0.45 mEq) of elemental calcium.
b.
   i. Hypocalcemia.
   ii. Hyperkalemia.
   iii. During exchange transfusion in neonates.
   iv. Antidote to calcium channel blocker drugs (e.g. verapamil), $MgSO_4$.
c.
   i. Subcutaneous extravasation may lead to tissue necrosis.
   ii. Rapid administration leads to bradycardia and cardiac arrest.

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iii. Administration through improperly placed UVC may lead to liver damage.

d. Crisis (when serum Ca^{+2} < 5 mg/dL): 1–2 mL/kg IV over 5 minutes followed by maintenance: 5–8 mL/kg/day continuous infusion or in divided doses.

e.
i. Volume expansion with isotonic normal saline.
ii. Furosemide—1 mg/kg q 6–8 hourly IV.
iii. Glucorticoids: Hydrocortisone—10 mg/kg/day.
Methyl prednisolone—2 mg/kg/day.

A 28:

a. K_1—Phytonadione.
K_2—Menaquinone.
K_3—Synthetic (fat soluble–menadione: water soluble—menadione sodium bisulfite).

b. Factor II, VII, IX, X, protein C, protein S.

c. i. Increased PIVKA II levels.
ii. Increased clotting time.
iii. Increased PT and APTT.

d.
- Early: within 24 hours of life or in utero.
- Classical: up to first 7 days (usually day 2, day 3).
- Late: after first week (2–16 weeks).

A 29:

Type of antigen	*Examples*
• Live bacteria, attenuated	BCG, Ty 21a
• Live virus, attenuated	OPV, MMR, varicella
• Inactivated bacteria	Pertussis, whole cell killed typhoid
• Inactivated virus	IP, Rabies, HAV
• Toxoid	DT, TT, Td.
• Capsular polysaccharide	Typhoid Vi, Hib, meningococcal Pneumococcal
• Viral subunit	HBsAg
• Bacterial subunit	Acellular pertussis

A 30:

a. 0.5–2 mg/kg.

b.
- Hypertension.
- Tachycardia.
- Hypotension.
- Bradycardia.
- Increased cerebral blood flow and intracranial pressure.
- Hallucination, delirium.

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- Tonic clonic movements.
- Increased metabolic rate.
- Hypersalivation, nausea, vomiting.
- Respiratory depression, apnea increased airway resistance, cough.

c. Dissociative anesthesia and direct action on cortex and limbic system.

A 31:

a. Global alliance for improved nutrition.
b. True.
c. RSV infection in children less than 24 months with chronic lung disease.

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OSCE in Pediatrics

The first edition of *OSCE in Pediatrics* was well accepted by all, and on the basis of feedback we have come up with this updated second edition with more than 150 new questions. This volume, containing more than 550 questions based on the OSCE pattern, will help the student to familiarize himself with OSCE and help in preparation. The questions, designed on the format followed by the National Board of Examinations, are accompanied by high-quality clinical photographs and radiographs.



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