SUMMARY

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Drug absorption in the newborn infant is mainly determined by the blood flow at the site of administration , and the significant biochemical and physiological changes taking place in the gastro-intestinal tract soon after birth . Drug distribution is influenzed by the changes in the body composition as regard , the extra cellular volume , the total body fat , and the plasma proteins. The newborn infant has a lower activities of the drug metabolizing enzymes . Renal excretion of drugs is deficit , due to low glomerular filtration rate , deficit tubular function , and reduced renal blood flow .

Not all the drugs given to the pregnant mother have only teratogenic effects . Antenatal corticosteroids helps lung maturation . vitamin K prevents hemorrhagic disease of the newborn . and phenobarbitone is indicated to prevent the physiological jaundice of the newborn .

Epinephrine is indicated in cardio-pulmonary resuscitation of the newborn , being administered intravenously , intracardically, endotracheally or by intraosseous infusion . Naloxone , which is a specific morphine antagonist is indicated in the management of narcotic - induced depression , and septic shock . The administration of sodium bicarbonate remains a controversial management issue in resuscitation therapy . Administeration of glucose may improve the survivial of asphyxiated newborns .

Loss of body fluid without the loss of supporting tissue is termed dehydration . Dehydration can be isotonic , hypotonic or hypertonic . The plan of dehydration therapy in a clinical situation should provide for the deficit fluids , the normal maintenance requirements and the abnormal losses due to the present

illness . Blood transfusion is indicated for volume replacement , early anaemia of prematurity , newborn infants with respiratory adapation problems , and the low birth weight infants . Exchange transfusion is indicated in the management of erythroblastic infants . Granulocyte transfusion is indicated in the treatment of severe neonatal sepsis . Infusion of human serum albumin during phototherapy helps to detoxicate bilirubin .

Care must be taken in prescribing a drug to a nursing mother, as most of the drugs taken by the lactating mother are detectable in the breast milk .

Among the common cardiovascular drugs prescribed to the newborns are digitalis , furosemide , indomethacin , prostaglandind , sodium nitroprusside , captopril and dopamine . Digitalis is indicated in heart failure . congenital heart disease with left to right shunts . and other conditions in a digitalization intravenous dose of 30 uq / kq . followed bv a maintenance dose of 5 ug / kg for the full term newborn infant . Digoxin absorption may be reduced in newborn infants with congestive heart failure . The plasma protein binding of digoxin is 20 - 30 % . About one fourth of the body stores is metabolized daily . Unchanged digoxin is excreted by the kidneys . Serum level exceeding 3.5 ng / ml indicates toxicity . Furosemide , a potent loop diuretic , is indicated in heart failure , and to prevent the renal side effects of indomethacin , in a dose of 1 mg / kg intravenously . The onset of diuretic activity occurs within 1 hour . It is 90 % bound to plasma proteins . The furosemide glucuronidation pathway is developed at birth , Tndomethacin , the potent prostaglandin synthetase inhibitor , is indicated for the pharmacological closure of patent ductus arteriosus , and management of renal tubular

defects in a dose of 0.2 - 0.3 mg / kg orally or intravenously . Once absorbed it is highly protein bound . It is excreted in the urine unchanged . Prostaglandins are indicated to maintain the patency of the ductus arteriosus in congenital cyanotic heart disease . 70 % of the circulatinf prostaglandin E_2 is bound to plasma proteins . Prostaglandins are quickly inactivated by the pulmonary , hepatic and renal vascular beds . Sodium nitroprusside is a direct acting vasodilator which is indicated for the management of respiratory distress syndrome , persistent pulmonary hypertension, and shock in a dose of o.25 - o.5 mg / kg / minute by intravenous infusion , Cyanide intoxication may complicate sodium nitroprusside therapy . Captopril is an antihypertensive drug , acting by inhibition of the enzyme that converts angiotensin I to angiotensin II . Captopril is a safe and effective sole or adjunct drug to control neonatal hypertension due to hyperreninemia , in a dose of 0.1 - 0.4 mg / kg /dose , repeated 1 - 4 times / day as needed . An adequate dosage is effective within one hour of oral drug intake . Dopamine is a catecholamine , which is used in the treatment of circulatory shock of various etiologies in a dose of 15 - 25 ug / kg / minute . Dopamine therapy may be associated with local ischemic gangrene .

Oxygen therapy is indicated in the management of hypoxic hypoxia , anaemic hypoxia , and stagnant hypoxia . In the neonate, oxygen is provided through an icubator , oxygen hood , oxygen tent , nasal prongs , extracorpeal membrane oxygenation , and mechanical ventilation . The criteria for gradual reduction of oxygen therapy are disappearance of cyanosis , return of normal pulse , and increase in the amount of oxyhemoglobin . Retrolental fibroplasia is a well known complication of oxygen therapy in

the premature infants . Surfactant replacement therapy is indicated in the treatment of respiratory distress syndrome as a synthetic preparation preparation , a bovine surfactant , and natutal human surfactant . Surfactant therapy may be associated with increased shunt through the ductus arteriosus . Theophylline is indicated for the prevention and treatment of idiopathic apnea of prematurity . Doxapram is a potent respiratory stimulant which is useful in controlling idiopathic apnea of prematurity unresponsive to aminophlline or continuous positive air way pressure, as a preferable alternative to mechanical ventilation .

Crystalline penicillin is the water soluble salt of penicillin G , which is given by parenteral injection because it is not absorbed from the gut . Crystalline penicillin is not metabolized , and the fall in it's blood level is due to renal excretion . The main use of crystaaline penicillin is in the management of group A streptococcal infection , pneumococcal infection , infection by Neisseria species , and spirocheates . Ampicillin plus an aminoglycoside are indicated in the initial treatment of septicemia , menigitis , and urinary & respiratory tracts infections . Ampicillin is incompletely absorbed after oral intake , 20 % is bound to plasma proteins . It is widely distributed in the body fluids and tissues , but the concentration of ampicillin in the cerebrospinal fluid is only 10 % of the plasma level . The ultimate route of excretion of ampicillin is via the kidneys . Gentamicin is the commonly used aminoglycosides in the neonates in combination with ampicillin . Gentamicin is not absorbed from the gastro-intestinal tract . Only 10 % of the absorbed drug is bound to the plasma proteins . Distribution and metabolism of are influenzed by the gestational age and the birth weight of the

newborn infants , Chloramphenicol is the drug of choice for infections due to Salmonella species and Haemophilus influenzae . There is a considerable variability in the serum levels of chloramphenicol , when chloramphenicol palmitate ester is taken orally by the newborn infants due to immaturity of the gastro-intestinal tract functions . Chloramphenicol succinate has increased bioavailability in the premature infants . Gray baby syndrome may complicate chloramphenicol therapy due to immaturity of the conjugation pathway in the liver of the neonates . Vancomycin is indicated in severe infections caused by Staphylococci or streptococci resistant to penicillin and cephalosporins . Vancomycin is metabolized in the liver , and is also excreted by the kidneys in the active form . Hepatic and renal immaturity may explain the accumulation of the drug in the newborn infant . Cefotaxime is a new semisynthetic cephalosporin of the third generation , which is indicated for the treatment of neonatal meningitis due to gram negative Enterobacteria and treatment of gram positive coccal infections , in a dose of 25 mg / kg / dose, parenterally . Trimethoprim - Sulphamethoxazole is a potent bactericidial formed of trimethoprim and sulphamethoxazole in ratio of 1 : 5 . It is indicated in the treatment of many infections such as , otitis media , urinary tract infection , and Shigellosis . Sulphamethoxazole is metabolized by the liver by acetylation , conjugation , and oxidation . Kernicterus may complicates Trimethoprim - Sulphamethoxazole therapy in the neonates . Amphotericin B is indicated in the treatment of systemic fungal infection .

Phototherapy indicated in the management of neonatal hyperbilirubinemia to decrease the demand for exchange transfusion,

acts by photochemical detoxication of bilirubin, by photooxidation and photoisommerization .

Phenobarbitone is both a potent anticonvulsant , used in the treatment of neonatal convulsions, and a non specific enzyme inducer used in the management of phsiological hyperbilirubinemia . Diphenyl hydantoin is a potent anticonvulsant drug , which is added to the anticonvulsant regimen , when seizure activity is not controlled by phenobarbitone alone in a loading dose of 10 mg / kg intravenously , followed by a maintenance dose of 5 mg / kg / day , in divided doses every 12 hours . The pharmacokinetics of phenytoin in the neonate are unptrdictable due delayed absorption from the gut and deficiency of hepatic hydroxylation of the drug . Primidone appears to a useful adjunctive drug in the treatment of neonatal status epilepticus , refractory to the combination of phenobarbitone and phenytoin . 20 % of the absorbed primidone is converted to phenobarbitone and phenyl ethylmalonic acid .

Congenital hypothyroidism is a state of hypothyroidism starting during fetal or early postnatal life , which may induce irreversible damage to the developing brain . Treatment is initated within the first month of life to maximize the probalility of achieving a normal I.Q. , L - thyroxine is prescribed in a dose of 10 ug / kg / day . Thyrotoxic babies are occasionally born to women with Grave's disease . Neonatal thyrotoxicosis may cause mortality due to the cardiovascular complications . Treatment consists of various combinations of propyl thiouracil (25 mg/kg/day) , Lugol iodine (one drop/8 hours) , propraolol (1.5 mg/kg/day) , digitalis and sedatives .

Neonatal hypoglycemia is diagnosed if two successive measurements of blood glucose levels are below 35 mg % in the full-term

infant or below 25 mg % in the premature infant . Neonatal hypoglycemia is treated by glucose either orally or intravenously , corticosteroids if hypoglycemia recures or persists inspite of intravenous glucose infusion , glucagon & epinephrine are indicated in cases of hyperinsulinism , and diazoxide which is an antihypertensive drug inhibiting insulin secretion from beta cells of the pancreas , so it is indicated in cases of hypoglycemia associated with hyperinsulinism in a dose of 10 - 15 mg/kg/day orally in 3 - 4 divided doses . Early neonatal hypocalcemia of the premature infants is a physiologic phenomenon . On a rare occassion, neonatal hypocalcemia is secondary to congenital hypoparathyroidism. The major manifestation of neonatal hypocalcemia is tetany . Manifest tetany is treated by slow intravenous injection of 200 mg / kg 10 % calcium gluconate . After control of the acute attack , calcium therapy should be continued as needed to maintain serum calcium 8.0 - 9.0 mg % . Dietary factors are of importance in the management of latent tetany . Measures should be taken to reduce the phosphate load and to increase the calcium : phosphate ratio of milk feeding to 4 : 1 . Infants with the salt losing type of congenital adrenal hyperplasia syndrome due to 21 - hydroxylase deficiency , may require initial treatment with isotonic saline , hydrocortisohe sodium succinate , and desoycorticosterone acetate . Treatment of congenital adrenal hyperplasia requires provision of sufficient cortisol to supress adrenal androgem production and protect aganist stress . These infants should also receive salt supplemention and mineralocorticoid replacement .

All newborn infants should receive vitamin K at birth to prevent the ocurance of hemorrhagic disease of the newborn .Calcium and or phosphorous deficiency is the aetiology of rickets of prematurity , rather than a defect in vitamin D metabolism . Calcium

supplemention can prevent the radiologic change of rickets in the premature infants . The further addition of phosphorus maintains the plasma alkaline phosphatase values within the normal limits for the gestational age . A dose of 800 - 1000 I,U vitamin D / kg is considered safe and efficious for infants feeding on a formula milk which is not supplemented with minerals . True pyridoxine (vitamin B_6) deficiency is extremely rare . It does not occur at birth , but is a result of adequate intake of the vitamin over the first months of life . Vitamin B_6 dependency is not due to diminished transplacental or neonatal supply of the vitamin , but rather to an increased requirements . Iron therapy may aggravate anemia of prematurity . Iron supplements are not needed during the first 2 months of life .