Endocrinology and Metabolic Disorders Abstracts

Pediatric metabolic bone diseases: classification and an overview of clinical and radiological findings

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From practical point of view the metabolic bone disease should be categorized etiologically because of overlap of some endocrine bone diseases and skeletal dysplasia. The metabolic bone diseases affecting the bone formation and mineralization can be classified in four groups: A. Disorders with insufficient mineralization organic matrix: This group includes different types of rickets following vitamin D abnormalities such as nutritional deficiency and other conditions (hepatic renal disease, vitamin dependent rickets type I and type II). Also mineral deficiency by prematurity, X-linked hypophosphatasia and oncogenic rickets are classified in this group. The radiological finding depends on severity and the type of rickets. In general the bones are demineralized. The bone physes reveal widening and irregularity, fraying and broadening of the metaphyses and long bone deformity following osteomalacia. Inherited hypophosphatasia is another entity characterized by deficient mineralization of cartilage and matrix (osteoid), however calcium and phosphate product is normal. The radiological finding depends on severities. The neonatal type the skull is non-mineralized with marked deficiency of extremities. On later age metaphyses show prominent lucent defects extending into the metaphyses from the growth plates. B. Abnormalities of bone matrix formation. Osteogenesis imperfecta with decreased bone mineralisation due to insufficient matrix formation and quantative and qualitative defects in synthesis of type I collagen is found in this group. The radiological finding is heterogeneous and depends on severity in 5 different types and subtypes. In general osteoporosis, retarded calvarial bone formation, rib and tubular bone fractures and collapsed vertebral bodies are characteristic findings with bowing deformities. Both Copper (Menkes disease) and now rarely observed vitamin C deficiency causing also osteoid deficiency. Clinically Menkes disease is characterized by kinky hair and neurodegenerative symptoms. The radiological changes are irregular distal metaphysic with metaphyseal fractures by minor trauma. The clinical symptoms of scurvy are muscle and joint pain, malaise and lethargy, spongy gums(bleeding) and capillary ruptures. Radiological findings of scurvy are diffuse demineralization, prominent zone of provisional calcification, metaphyseal fractures with spur formation and subperiostal hematomas.

Keywords: metabolic bone disorders

Abnormalities of increased or decreased bone resorption

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The major cause of increased bone resorption is hyperparathyroidism in children with renal failure. Radiologically it manifest as renal osteodystrophy with subperiostal resorption along the phalanges, involving also the distal phalangeal tufts. Hyperphosphatasia is a rare autosomal recessive disease and also is a condition with increased bone turnover. It appears to be due to deficiency of osteoprotegen. Radiological signs are expanded and bowed diaphyses. There is marked demineralization with a heterogeneous pattern. Osteopetrosis is an example of decreased bone resorption with calcified cartilage. The several types of the disease are all caused by an abnormality of osteoclastic resorption usually due to heritable mutation. Depending on its type the radiological manifestation is different. Increased bone density, metaphyseal undermodeling and signs of fluctuating activity of sclerosering process and others are found. D. Iatrogenic and toxic metabolic bone disorders. There are several iatrogenic and toxic disorders affecting the resorption of bone and calcified cartilage, including biphosphanate and prostaglandine or toxic effect by hypervitaminosis A and D and by heavy metal poisoning (lead). Also primary oxalosis should be classified in this category. Radiological changes in all these groups are different and characteristic. Increased bone density and opaque dense lines due to cyclic therapy will be found following biphosphanate treatment. Prostaglandins stimulate bone resorption with radiographic recognizable new bone formation. In chronic hypervitamin A hyperosteosis of the long bone and periosteal bone formation is the radiological finding. Hypervitaminosis D however shows an increase in width of provisional zone initially and cortical thickening later on. Lead lines due to excessive calcified cartilage are to be observed by lead poisoning. In oxalosis crystal deposit occurs in bone with formation of giant cell granulomatosis. Inflammatory response, osteosclerosis with greater cystic lesion will be developed. Based on above mentioned data the clinical and radiological findings of different metabolic diseases will be shown with special attention on characteristics of the radiological findings and their clinical signs and symptoms.

Keywords: metabolic bone disorders

The importance of hypothalamic pituitary adrenal axis suppression from topical corticosteroids

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The Importance of Hypothalamic-Pituitary-Adrenal Axis Suppression from topical corticosteroids may have more potential to cause adrenal suppression than what many physicians realize. This suppression can lead to debilitating and potentially fatal adrenal crisis. The biggest problems seemed to be with betamethasone propionate, which was approved in 2001, and comes as a cream, ointment or lotion. In one study of Diprolene AF Cream(0.05%) in 60 patients with atopic dermatitis, ages 1 to 12, 58% had adrenal suppression. For Diprosone Ointment(0.05%), the rate was 53%, and that physicians should be more concerned about prescription use and it would be difficult to approve these drugs for over-the-counter use. Currently, all the drugs in this class carry warnings that systemic absorption can cause HPA axis suppression, leading to Cushing's syndrome, hyperglycemia and glucosuria.

Children are at greater risk, and are more vulnerable to growth retardation, delayed weight gain, and intracranial hypertension. Since 1969, the FDA has received reports of severe adrenal suppression in 65 adults and 29 children. Two adults died, and two children died. Most of the serious problems followed prolonged or excessive use of the drugs, use of a super-potent steroid, using multiple topical steroids, or using them at the same time as oral or inhaled steroids. Most panelists agreed that the adrenal suppression and growth retardation were significant side effects that should block over-counter sales, although some said consumers should be given the benefit of the doubt.
Keywords: adrenal Suppression, topical corticosteroids, adrenal crisis

Clinical, laboratory findings and outcome of 22 patients affected by cystinosis in Iran (1994-2010)

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Background: Cystinosis is caused by deficiency of cystinosin, the cystin transporter located in the lysosomal membrane. Late diagnosis results in accumulation in major organs(liver, kidneys, thyroid, pancreas, eyes, muscles, and bone marrow). The diagnosis is confirmed by measurement of WBC cystine. The aim was to study the clinical, laboratory findings and outcome in 22 Iranian patients affected with cystinosis.
Methods: A study was on 22 patients. The diagnosis was confirmed by observing cystine crystals in cornea or in bone marrow aspiration.
Findings: Total patients were 22; females were l5. 15/22 had related parents. Mean and median age at onset were 9.63 and 19 months. Age at diagnosis was 3.54 years. Mean time between symptom onset and diagnosis was 33 months. Signs and symptoms were as following: Failure to thrive: 22/22; Polyuria and Polydipsia; 12/22, Hypothyroidism 9/18, Photophobia; 4/22, Fair skin; 4/13, Myopathy: 7/15, Fanconi Syndrom; 22/22, anemia 20/22, Phosphaturia; 15/15, Hypercholestrolemia 5/15, Diabetes Mellitus 0/22, Hypokalemia, hypocalcemia, hyponatremia, each one; 18/22. Creatinine level rising: 8/22, ESRD; 4/22; Two underwent kidney transplantation. Mean age at renal failure onset; 9 years, 4/8 were poorly compliant and 4/8 were diagnosed at dialysis department.
Conclusion: Although cystinosis is a rare disease it should be suspected in any infant with FTT because of its complications specially renal failure. The gap between diagnosis and treatment was 3.54 years, higher than other studies(1.6 years),but the outcome was better (63% had normal creatinine compared to 22.5% in Brazil).
Keywords: cystinosis, outcome, complications, clinical symptoms, lab findings

Prevalence of vitamin D deficiency in 7-11 year old children in Birjand, east of Iran, 2012

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Background: Vitamin D deficiency is an unrecognized epidemic and a common health problem worldwide. This study was conducted to evaluate the vitamin D status in primary school children. The aim of the present study was to assess vitamin D status in primary schoolers in Birjand during Fall and Winter(2011-2012).
Methods: The present cross-sectional and descriptive-analytical study dealt with 238 seven-twelve year old primary schoolers. Sampling was done through randomized multiple –stage method. Necessary data was obtained using a questionnaire consisting of questions about weight, height, and serum level of 25(OH) vitamin D. Serum level of 25(OH)D <20ng/ml, level 20-30ng/ml and the level >30ng/ml was defined as deficient, as insufficient and as sufficient respectively.
Findings: Mean Vitamin D level in the subjects was 15.4±8.1ng/dl; while the vitamin level ranged between 4.3(the minimum) and 63.1ng/dl(the maximum). It was found that 76.9% of the students suffered vitamin D deficiency. Insufficiency of the vitamin was diagnosed in 18.5% and sufficient level in 4.6%. Moreover, vitamin D deficiency was significantly more in females.
Conclusion: Vitamin D deficiency prevalence in primary schoolers is high. Regarding that the problem can be overcome by inclusion of nutritional supplement, intervention is recommended.
Keywords: prevalence, vitamin D deficiency, children, students

Comparison of two definitions of metabolic syndrome in overweight and obese children and adolescents

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Background: Few studies have estimated the prevalence of Metabolic Syndrome (MS) in children and adolescents, and diagnostic criteria have not been standardized. Definitions agree on the essential components of the syndrome, but there are differences in some diagnostic criteria. The purpose of this study was to compare two proposed definitions of MS among overweight and obese children in Qazvin, Iran.
Methods: The study was conducted on 100 healthy subjects aged between 6 and 16 years with a high BMI for their age and sex. 58% of subjects were females. Physical examination including evaluation of weight, height, BMI, and blood pressure measurement was performed. Blood levels of glucose, insulin, total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, triglycerides, and uric acid were measured after a 12-hour overnight fast. Two definitions of MS: NCEP ATP III criteria and a modified definition by Weiss et al were compared. Variables were compared using the Student's t-test, chi-square and Mann-Whitney U tests, and agreement between the two definitions was analyzed using kappa values.
Findings: The subjects had a mean BMI of 26.02 ± 4.38 and 80% had obesity. Insulin resistance was found in 81% of the study population. MS was present in 50% of the overweight and 66.2% of the obese subjects using the NCEP ATP III criteria. MS was present in 25% of the overweight and 42.5% of the obese subjects using the definition by Weiss et al. The overall kappa value for the two definitions of MS was 0.533. There were no statistically significant differences between the two definitions of MS in participants.
Conclusion: The prevalence of MS in children and adolescents depends on the criteria chosen and their respective cutoff points. The NCEP ATP III criteria are

able to diagnose a larger number of children and adolescents at metabolic risk.
Keywords: children, adolescents, obesity, metabolic syndrome

Clinical, Laboratory data, molecular features and outcome of nine patients affected with citrulinemia

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Background: Urea cycle is the final common pathway for excretion of waste nitrogen in mammals and excretable urea and denovo biosynthesis of arginine. There are six consecutive defects of any of these enzymes result in UCD(Urea Cycle Disorders), that often result in life threatening hyperammonemia. Citrullinemia type 1 is the defect of ASS enzyme which is caused by mutations in the gene located on long arm of chromosome 9 that harbours 16 exons. 87 mutations have been already found in ASS1 Gene which causes different phenotypes. It presents as a clinical spectrum that includes an acute neonatal form(classic form), a milder late onset form, a form without symptoms or hypeammonemia and a form in which women have onset of severe symptoms during pregnancy or post-partum. Initial symptoms are frequently neurologic deterioration.
Methods: It is a retrospective review of 9 cases from 2008-2013. Sequence analysis of ASS1 gene confirmed diagnosis. Standard and emergency treatment for hyperammonaemia had started for the patients.
Findings: The results are as following: 5 males, consanguinity: 5/9, 7/9 were presented with poor feeding and lethargy at 0-3rd day of life. Citrulline: 1147-3871 µmol/L, ammonia: 3.4-9 times(severe neonatal form). 4/7 died within a few days before treatment. 2/7 survived and developed normally; died in hyperammonemic attacks at 4-5 months despite aggressive therapy including hemofiltration. 1/7 survived, despite two attacks, one at birth and the second at 10 months, intractable vomiting, lethargy, kidney stones and developmental delay; Ammonia: 6.5 times, citrulline: 2717. She improved at 20 months. 2/9 were referred at the age of 2.5 years; case 1 for failing to gain weight(10 kg) with Citrulline:1298; Case 2 for delayed development and intractable convulsion following an attack at age of 8 months(citrulline:1147). Both responded well regarding optimal growth and development. Sequence analysis: p.G390R(c.1168G>A) in severe phenotype 3/3 and p.R403A in late onset case 2.
Conclusion: Citrullinemia type 1 has different phenotypic features.The most important prognostic factors are the mutation type, ammonia level and early treatment.
Keywords: hyperammonemia, urea cycle defect, Citrulline

Growth hormone indication in chikdren

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Background: Growth hormone(GH) produced by the somatotropic cells on the anterior part of the hypophysis. Its clinical application for many years was restricted to GH deficient children, but in recent years it has been widened to various other clinical conditions, not necessarily related to short stature. Currently, FDA has approved its usage in children with GH deficiency, Turner or Noonan syndromes, chronic renal failure, children born small for gestational age (SGA) and Prader-Willi syndrome. The aim of this paper was to summarize the current data on GH administration in modern pharmacotherapy.
Keywords: growth hormone, children, indication

Post-traumatic panhypopituitarism: a case report of a child

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Background: Childhood panhypopituitarism includes acquired or congenital one can presents with growth retardation and diabetes insipidus. Head injury is one of the causes of panhypopituitarism. The aim of this study was to introduce a child with panhypopituitarism in Iran.
Case Presentation: A 26-month-old boy presented to Children's Medical Center with the repeated attacks of hypoglycemia, seizures, hypothermia and lethargy, that was examined in Tajikistan without any results. In clinical examination, he had puffy face, thinning hair and short stature. In past history, child's growth and development were normal until 14 months of age. At 14 months old, he had head injury following the fall of TV. Following the incidence, he was not able to speak and walk well. The laboratory findings showed decrease in prolactin, FT4, TSH, HGH, cortisol, ACTH, IGF1 and urine osmolality. The MRI report showed empty sella with brain atrophy and diffuse gliosis. The patient has been treated with hydrocortisone and levothyroxine. After normalization of thyroid function, recombinant GH and desmopressin were prescribed.
Conclusion: Hypopituitarism may be diagnosed long after a head injury incidence. Timely diagnosis and treatment of endocrine problems as needed as well as attentive follow-up of the growth and development are necessary in children with traumatic brain injury.
Keywords: post-trumatic, panhypopituitarism, child

Virtual social network for management of obesity in children and adolescents

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During the past few years, internet, mobile phone or computer based clinical protocols have shown promising long-term effects on the improvement of healthy lifestyle interventions for the treatment of obesity with or without complications. These technologies have opened potential applications to revolutionize health care in different inpatient and outpatient settings. Technology cannot replace medicine, but it can improve the efficacy of traditional clinical and healthy lifestyle protocols. For obese children, behavioral treatment results in only small changes in relative weight and frequent relapse. The health providers need psychological intervention to weigh maintaining diet and prevent of relapsing in children. The current study investigated the effects of a virtual social network on weight loss maintenance in obese children. This kind of communication acts as a motivational factor for increasing exercise and anxiety-depression regulator.

Methods: Forty-four children(aged 8–14 years) who were in the final months of a 8-month nutrition and diet therapy program were randomized to either the 6 week virtual social network(VSN) condition or usual treatment only as a control group. The VSN consisted of a 25-session training of inhibition and working memory.
Findings: Child performances on cognitive tasks of inhibition and working memory and child care worker ratings as well as weight loss maintenance after leaving the clinic were determined. Children in the VSN condition showed significantly more improvement on the working memory task as well as on the child care worker reports of working memory and meta-cognition than the children in the care as usual treatment group. They were also more capable to maintain their weight loss until 8 weeks post-training.
Conclusion: This study showed promising evidence for the efficacy of a VSN as weight stabilization intervention in obese children. This program already uses the other problems with health behaviors.
Keywords: obesity, children, intervention, virtual social network (VSN), motivation

An infrequent cause of primary amenorrhoea: 46 XX pure gonadal dysgenesis

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"pure gonadal dysgenesis" is applied to one particular variety of defective gonadogenesis. XX gonadal dysgenesis is a type of female hypogonadism in which no functional ovaries are present to induce puberty in an otherwise normal girl whose karyotype is found to be 46,XX. With nonfunctional streak ovaries she is low in estrogen levels (hypoestrogenic) and has high levels of FSH and LH. The usual phenotype of 46,XX gonadal dysgenesis includes normal stature, sexual infantilism, bilateral streak gonad, normal female internal and external genitalia, and primary amenorrhea. The streak gonad occasionally produces estrogens or androgens, but malignant transformation is rare. Incomplete forms of this condition may result in hypoplastic ovaries that produce enough estrogen to cause some breast development and a few menstrual periods followed by secondary amenorrhea. This heterogeneous syndrome occurs sporadically or with autosomal recessive inheritance and in some instances is associated with other congenital malformations; some familial cases have been associated with sensorineural deafness(Perrault's syndrome). we report 3 siblings with pure gonadal dysgenesia with or without normal secondary sexual characteristics in one family. In conclusion, one should think of pure gonadal dysgenesia with different presentation like primary amenorrhea with or without normal secondary sexual characteristics in one family.
Keywords: pure gonadal dysgenesis, primary amenorrhea

Ectopic posterior pituitary associated with normal growth and gonadotropin deficiency

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Ectopic posterior pituitary is a congenital abnormality due to faulty embryogenesis. The clear underlying etiology of an ectopic posterior pituitary has not been established although recent reports suggests that it may share a similar pathogenesis as septo-optic dysplasia. The HESX1 gene has been implicated in both conditions. Regardless of the underlying cause, an ectopic posterior pituitary results from incomplete downward extension of the diencephalon (Infundibulum). As a result, releasing factors released by the hypothalamus which usually travel down the portal circulation to the anterior pituitary can only reach their target via the general circulation. This results in frequent growth hormone deficiency, and in some instances panhypopituitarism but we report a 17-year-old iranian female with Ectopic Posterior Pituitary to associate with normal growth and multiple endocrine deficiency. In our case amazingly there is no evidence of growth hormone deficiency. In conclusion, one should think of Ectopic posterior pituitary with different presentation like normal growth and multiple endocrine deficiency.
Keywords: ectopic posterior pituitary, normal growth, gonadotropin deficiency

Should we consider cutoff point 2 or 4m/dl in Screening of PKU?

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Background: Phenylketonuria(PKU) is one of the most common inborn errors of metabolisms. Neonatal screening has allowed early detection of PKU, which therefore led to successful treatment. After collecting blood from infants three days after birth, level of Phenylalanine(Phe) was tested in three stages, using the enzymatic colorimetric method and high performance liquid chromatography (HPLC). Infants with concentrations of Phe higher than 4mg/dl after HPLC test, confirmed as hyperphenylalaninemia.
Methods: Patient with PHE 2-4 mg/dl refered to Pku center in Yazd. Head circumference and weight measured and monthly patient was followed up. If patients had developmental delay or microcephaly, we tested HPLC. Ten patients referred to PKU center. 1 patient had PHE 3mg/dl in primary screening. This patient has had developmental delay since 9 months old. We send PHE with calorimetery and HPLC method. The amount of PHE was high(8mg/dl).
Conclusion: The question is that the level of cutoff point for screening PHE is 4 mg/dl (according Iranian Guide line) or 2 mg/dl (according to text book).
Keywords: PKU, child, screening

Mutation analysis in non-classic Form of 21 hydroxylase deficiency

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Background: Non classic(NC) form of congenital adrenal hyperplasia(CAH) due to 21 hydroxylase deficiency is the late onset form of the disease with milder signs. The adrenal precursors are mildly increased in this form ranging between the heterozygote individuals and severely affected ones. The signs and symptoms are variable and some may be asymptomatic. Molecular diagnosis of these individuals helps us to confirm the nonclassic form of the disease.

Methods: Direct sequencing analysis for the NC 21 hydroxylase deficient individuals was performed for 10 affected individuals.
Findings: The molecular analysis showed that 2 had compound heterozygous mutations, 3 affected individuals had heterozygote mutation and 5 individuals had no mutation in coding regions.
Conclusion: The study showed that heterozygous individuals may show signs and symptoms of the disease; although more analysis is needed to confirm this conclusion. Also the individuals with no mutation found also need to be analyzed for other genes in the steroid pathway.
Keywords: congenital adrenal hyperplasia, 21 hydroxylase, nonclassic, molecular diagnosis

Self-monitoring of blood glucose

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In people with Type 1 Diabetes, self-monitoring of blood glucose(SMBG) is an integral part of treatment. SMBG can play an important role in improving metabolic control in patients with diabetes. It is recommended for patients treated with insulin and is desirable for all patients with diabetes. Judicious use of SMBG data can help to improve glycemic control, select an anti-diabetic regimen, and provide powerful feedback to patients wishing to improve metabolic control. Among patients with type 1 diabetes, SMBG has been associated with improved health outcomes. Self monitoring of blood glucose is an opportunity for people with diabetes to take control of their health. The main goal of treatment is to keep blood glucose levels in the normal or near-normal range. Monitoring blood glucose levels is one of the best ways of determining how well a diabetes treatment plan is working. Adjusted for age, gender, diabetes duration, year of treatment, insulin regimen, insulin dose, BMI-SDS, and center difference, SMBG frequency was significantly associated with better metabolic control with a drop of HbA1c of 0.20% for one additional SMBG per day. However, some studies showed that increasing the SMBG frequency above 5/d did not result in further improvement of metabolic control. Further, costs associated with SMBG are high and rising steadily due to the increasing prevalence of diabetes and higher rates of self-monitoring. Most experts agree that insulin-treated patients should monitor blood glucose at least four times a day, most commonly fasting, before meals, and before bed.
Keywords: SMBG, glycemic control, diabetes

BH4 effect on phenylalanine level on various types of Phenylketonuria

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Background: Phenylketonuria(PKU) is the most widespread congenital disease. The most important treatment for it is the using of a dietary regime. It is very difficult for youngsters and as it affects the quality of life, therefore, other methods are approached to reduce this problem and the use of BH4 is the one of these methods. Hence by undertaking this study, we have evaluated the response of different types of phenylketonuria to this drug.
Methods: This study method was a pre and postclinical experimental trial. The patients were chosen during a survey among the patients visiting the metabolic diseases' section of the Children's Medical Center after being diagnosed as definite cases of hyperphenylalaninemia and phenylketonuria disorder. The patients having the criteria for this study were selected with the knowledge and permission of their parents. All of these subjects were given a BH4 tablets without changing in their dietary regime. The phenylalanine level of their blood was measured before and 2, 4, 8 and 24 hours after the consumption of the drug.
Findings: 50 phenylketonuria patients were studied under this program; most of participants were suffering from medium phenylketonuria. Among the patients under study, positive response was shown to the treatment by 2 subjects(4%) after two hours of the loading test, by another 2 subjects(4%) after 4 hours, by 5 subjects(10%) after 8 hours, and 6 subjects(12.8%) after 24 hours. No significant statistical difference was seen in the serum phenylalanine level except in the preliminary stage, i.e. between base serum phenylalanine level and two hours after treatment($P<0.01$).
Conclusion: For timely screening of the phenylketonuria patients responding to BH4 treatment, the health authorities should consider priority for the BH4 loading test according our protocol. It is also suggested that in future attempts for this study, treatment for a longer period should be taken into consideration and a greater number of patients should be selected as sample.
Keywords: phenylketonuria, hyperphenylalaninemia, sapropterin dihydrochloride, BH4, neopterin- biopterin measurement

Differential diagnosis of different type of rickets

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Rickets is defined as a defective mineralization of growing bone matrix. Patients present with seizures, limbs deformity and bone pain as a most common clinical presentation of rickets. When we face the children with these presentation, evaluation for rickets is necessary. Major causes of rickets are vitamin D deficiency, impaired vitamin D metabolism or function, phosphate deficiency or phosphate homeostasis disorder. Infants and children with rickets typically present with normal to low-normal serum calcium, low phosphorus and elevated alkaline phosphatase levels. Rickets can be classified based on serum PTH level to two hypocalcemic and hypophosphatemic groups. In the case of secondary hperparathyroidsm, one should suspect hypocalcemic rickets including vitamin D deficiency rickets, vitamin D deficiency rickets type I, vitamin D deficiency rickets type II which coincides with low 25OH D3 level, low 1,25(OH)2 D3 and high 1,25(OH)2 D3 level respectively. In the case of normal or low serum PTH level, one should suspect hypophosphatemic rickets including X-linked hypophosphatemia, hypophosphatemia due to renal tubular acidosis, Fanconi syndrome, and … . Whenever a patient is refered with rickets, taking into account conditions in our country in addition to nutritional rickets, other cases like vitamin D deficiency rickets type I, vitamin D deficiency rickets type II, X-linked hypophosphatemia, hypophosphatemia due to renal tubular acidosis, Fanconi syndrome and … should be considered.
Keywords: Nutritional Rickets, Vitamin D Deficiency Rickets Type I, Vitamin D Deficiency Rickets Type II

First report of 3-oxothiolase deficiency in Iran

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Mitochondrial acetoacetyl-CoA thiolase(3-oxothiolase) deficiency is a rare metabolic disorder involving ketone body metabolism characterized by acute attacks of vomiting, acidosis, ketosis, lethargy and some laboratory criteria including excessive excretion of 2-methyl-3-hydroxybutyric acid in urine.
Case Presentation: This is a case report of 3-oxothiolase deficiency in a young Iranian boy with presentation of intractable vomiting and severe metabolic acidosis following a common cold in six months of age with abundant urinary 2-methyl-3- hydroxybutyric acid. This is the first Iranian 3-oxothiolase deficiency case report as searched in the literature.
Keywords: 2-methylacetoacetyl-CoA thiolase deficiency, Betha-ketothiolase deficiency, 3-oxothiolase deficiency, metabolic acidosis

Alkaptonuria diagnosed at the age of 20-month; a case report

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Background: Alkaptonuria is an inherited metabolic disorder characterized by deficiency of homogentisic acid oxidase. The disorder characterized with the triad of arthritis, ochronosis and homogentisic aciduria. The aim of this study was to introduce a young child with alkaptonuria in Iran.
Case Presentation: A 20-month-old boy presented to Children's Medical Center with the complaints of darkening of the urine. There was dark red color of the diaper from infancy. Child's growth and development were normal. There was no discoloration of any other area of the skin, no other abnormal finding on physical examination of eyes, ear cartilages, heart, limbs and joints. The urine color was changed to dark red when exposed to air. Laboratory data revealed normal blood tyrosine level. Chromatography of urinary amino acids was normal. Urine organic acids were analyzed by Gas chromatography–mass spectrometry(GC-MS), that presence of the high amount of homogentisic acid was reported. Combination of oral ascorbic acid and low-protein diet were initiated as treatment for the patient that urine discoloration was somewhat relieved.
Conclusion: Report of this case is considerable due to early diagnosis and partial response to treatment with ascorbic acid and low-protein diet.
Keywords: Alkaptonuria, dark urine, homogentisic acid

Craniopharyngioma presenting with delay to puberty: a case report

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Background: Craniopharyngioma is a relatively rare pediatric tumor that make up to 6% of the childhood intracranial tumors and 3% of all intracranial tumors. It is a rare solid or mixed solid-cystic tumor which typically arises in the sellar/suprasellar region. It usually manifests as endocrine disturbances such as short stature and delayed puberty. In this report, a rare case of this disease in a 16.5 year old girl is discussed.
Case Presentation: A 16.5-year-old girl referred for evaluation of short stature. The patient had 141 cm height and 37 kg weight. Hieght was -4SD below the mean. She was conscious and alert girl who was drinking more than usual without complaints of headache, vomiting and diminution of vision. Early examination was characterized that she was suffering from delayed puberty, her breasts were undeveloped and had stopped growing, and her menses wasn't started at this age. The neurologic examinations were normal; the optic disc was pale but she had not papilloedema. Other general physical examination was normal.The biochemistry tests revealed that she had hypogonadotrop hypogonadism. Magnetic resonance imaging(MRI) demonstrated a suprasellar multiloculated mixed cystic-solid mass(48.27.45 mm) suggestive of a craniopharyngioma.
Conclusion: This tumor tends to be found between the ages of 6 and 14 years and in patients over age 45. Craniopharyngioma have a tendency to grow and press on parts of the brain or other nearby tissue, and become large before is diagnosed; its treatment can be difficult. Extensive morbidity may be present at diagnosis and furthermore with treatment. Most people who have craniopharyngioma do not have symptoms and signs of increased intracranial pressure; the most common presentations are polydypsia, delayed puberty, and stunted growth which are evidences of decreased pituitary hormone production. The prognosis of patients depends on the early diagnosis of this tumor which would help to improve outcomes.
Keywords: craniopharyngioma,delayed puberty, short stature

A systematic review on PKU screening models

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Background: Classical phenylketonuria (PKU) is one of the rare metabolic disorder results from a deficiency of a liver enzyme. Enzyme deficiency leads to increased levels of the amino acid phenylalanine in the blood and tissues. Mental retardation, microcephaly, seizures, behavior abnormalities, and other symptoms are characterized as the untreated state. Screening programs for the detection of PKU in newborns are widespread and generally accepted by many developed countries. Review studies on PKU screening models to define the essential elements of PKU screening programme.
Methods: We systematically reviewed studies published, prior to June 27, 2013, on PKU screening models. A computerized search strategy was performed using Medline and Cochrane Database of systematic Reviews with appropriate keywords. Additionally, the references list of all identified relevant studies were searched for more related publications. A reviewer applied selection criteria for the relevant studies.
Findings: The computerized searches comprised 32 articles, of which 9 articles (28.1%) were potentially suitable for inclusion in this review. The review results in three different screening models of a total of 9 potentially appropriate studies, 2 mainly focused on medical diagnosis

تولد، رتبهٔ تولد، TSH، T4خون وریدی، سن مادر، خویشاوندی والدین (درجه ۲) در دو گروه مورد بررسی ومقایسه قرار گرفتند.
یافته ها: از ۱۵۰نوزاد مبتلا به کم کاری مادرزادی تیروئید مورد مطالعه ۷۹ نفر یعنی۵۲/۳٪ مذکر و ۷۲ نفر یعنی۴۷,۷٪مؤنث بودند. در گروه مبتلا به کم کاری تیروئید و گروه شاهد تفاوت جنسی معنی‌دار نبود. مطالعه ما نشان داد که فصل تولد در دو گروه تفاوت معناداری ندارد و تاثیری در ابتلای نوزادان به کم کاری مادرزادی تیروئید ندارد. از ۱۵۰ نوزاد مبتلابه کم کاری مادرزادی تیروئید ۴۱نفر از نوزادان معادل ۲۸٪ دارای والدین خویشاوند بودند و در ۱۱۰ نفر از نوزادان معادل ۷۲٪ والدین ویشاوند نبودند و در گروه نوزادان سالم ۲۰ نفر معادل٪ ۱۴از نوزادان دارای والدین خویشاوند و در۱۲۰نفراز نوزادان معادل۸۶٪ والدین خویشاوند نبودند (P<0.005) و فراوانی خویشاوندی والدین در مبتلایان به کم کاری مادرزادی تیروئید به طور معنا داری نسبت به گروه سالم بیشتر بود. **نتیجه گیری:** مطالعه ما نشان داد که خویشاوندی والدین یک عامل مهم در ابتلای نوزادان به کم کاری مادرزادی تیروئید می باشد. بررسی علل کم کاری مادرزادی تیروئید درمواردی که والدین خویشاوندی نزدیک هستند و نیز آموزش زوج ها قبل از ازدواج توصیه می شود.
کلمات کلیدی: کم کاری مادر زادی تیروئید، خویشاوندی، همدان

غربالگری کم کاری تیروئید مادرزادی و فنیل کتونوری در ایران

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در این بحث به ۲ بیماری بسیار مهم (کم کاری مادر زادی تیروئد و بیماری فنیل کتونوری) که در صورت عدم غربالگری و تشخیص دیر باعث عقب افتادگی ذهنی جبران ناپذیر می شود اشاره خواهد شد. بیماری کم کاری مادر زادی تیروئید که غربالگری آن برای اولین بار در سال ۱۳۶۶ توسط دفتر تحقیقات غدد دانشگاه علوم پزشکی شهید بهشتی توسط استاد ارجمند جناب آقای دکتر فریدون عزیزی انجام شد ، به دلیل فراوانی میزان فراخوان بعلت کمبود ید در کشور در آن زمان پس از ۲ سال متوقف شد و پس از رفع کمبود ید در کشور از سال ۱۳۷۶ مجدداً در بعضی بیمارستانهای تهران و سپس در دماوند اجرا شد . در این بررسی ها و همچنین در مطالعه شیراز شیوع کم کاری تیروئید به ترتیب یک در ۹۱۴ ، و ۱۴۳۳ بوده است . غربالگری بین روز ۳ تا ۵ تولد با اندازه گیریTSH خون پاشنه پا بر روی کاغذ فیلتر انجام می شود . در صورت TSH بیشتر یا مساوی ۱۰ mU/L مجدداً روی فیلتر آزمایش شده و در صورت بالا بودن مجدد از آن مقدار ، سطح FT4 و TSH خون وریدی اندازه گیری می شود و در صورت بالا ماندن TSH و پایین بودن T4 درمان با لووتیروکسین به میزان ۱۰ تا ۱۵ میکروگرم / کیلوگرم شروع می شود . جهت اطمینان از نوع همیشگی که غالبا به علت دیس ژنزی تیروئید و یا نوع اکتوپی باشد باید حتما سونوگرافی تیروئید و یا اسکن تیروئید انجام شود . هم چنین بررسی آنتی بادی های بلوکان مادر در صورتی که تیروئید در اسکن دیده نشده لیکن در سونوگرافی قابل شناسایی باشد مس تواند در جهت رد تشخیص هیپوتیروئیدی همیشگی و وجود هیپوتیروئیدی موقتی کمک کننده باشد.هدف درمانی نگهداری T4 در نیمه بالایی محدوده نرمال برای سن و TSH در نیمه پایینی محدوده نرمال (در شیرخواران کمتر از ۳ سال بین 0/5 تا ۲ mU/L) می باشد . در صورت موارد مشکوک می توان تا ۳ سالگی درمان را ادامه داد و سپس قطع کرد ، در صورت افزایش TSH پس از یک ماه نیاز است که درمان محدداً شروع شود. فنیل کتونوری بیماری ای با شیوع ۱/۱۰۰۰۰ تا ۱/۲۰۰۰۰ در کشورهای مختلف می باشد . این بیماری در صورت عدم شناسایی و درمان در هفته های اول تولد باعث عوارض شدید مغزی ، تشنج ، بی قراری و علائم شبه اوتیسم می گردد . در صورت فنیل الانین بیشتر از ۲۰ میلی گرم / دسی لیتر نوع کلاسیک بوده که در اثر کمبود آنزیم فنیل آلانین هیدروکسیلاز می باشد . مقادیر کمتر از آن بعنوان هیپرفنیل آلانینمی اطلاق می شود. در حدود ۲

approach, 3 articles recommended much more comprehensive screening program integrated mainly into health care system. The rest proposed a holistic screening program; combination of medical, social and political services. Based on our data, the third model, with the support from the government markedly improved PKU control and management. Our data showed government`s support plays a great role in PKU management. **Conclusion:** Our results revealed a holistic screening model at medical, social and political levels which is essential to improve PKU management. In addition, more governmental support, particularly in terms of laws and rules, is needed to make PKU screening more efficient.
Keywords: phenylketonuria, PKU, screening

اثر چاقی در فارماکوکینتیک داروها در بچه ها

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وزن در چاقی مربوط به افزایش بافت چربی می باشد. پس انتشار داروهای لیپوفیلیک در بافت ها در فرد چاق متفاوت می باشد. انتشار داروهای هیدروفیلیک نیز به علت کاهش آب بدن و حجم خون در افراد چاق متفاوت است. متابولیسم داروها به علت شیوع کبد چرب در افراد چاق متابولیسم کبدی تغییر می یابد. اکسیداسیون، کنژوگاسیون، گلوئیداسیون، سولفاته و استیلاسیون نیز تغییر می یابد. همچنین سطح پروتئین پلاسما تغییر می کند و در نتیجه بر روی داروهای باند با پروتئین اثر می گذارد. دفع کلیوی: اثر چاقی روی کلیرانس نامعلوم است، ولی کلیه ها بزرگتر و گردش خون کلیه بیشتر می شود. در نتیجه داروهای با دفع کلیوی لازم است به دفعات بیشتری داده شود.
نتیجه گیری: پزشکان باید فارماکوکتینک داروها را در بچه های چاق در نظر بگیرند. بعلاوه نوع متابولیسم دارو، عملکرد ارگانها (کبد و کلیه)، نوع عارضه و بیماری را در نظر بگیرند. جهت پیشگیری از عوارض دارو باید سطح دارو دقیقاً چک شود. داروهای با خاصیت لیپوفیلیک کمتر مثل لیتیم باید براساس وزن ایده آل (IBW) محاسبه و داروهای با گرایش لیپوفیلیک بالا مثل (آنتی باکتریال و ضد کانسرها) براساس وزن ایده آل + درصد افزایش وزن اضافه حساب شود. دوز Loading داروها براساس IBW و دوز نگهدارنده براساس کلیرانس سنجیده شود،
کلمات کلیدی: لیپوفیلیک، گرایش به چربی ها، IBW ، وزن ایده آل بدن

خویشاوندی والدین درمبتلایان به کم کاری مادرزادی تیروئید در شهر همدان

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هدف از این بررسی، تعیین فراوانی خویشاوندی والدین در شیرخواران مبتلا به کم کاری مادرزادی تیروئید در شهر همدان و مقایسه آن با گروه سالم درسال ۱۳۸۹ بود.
روش: در یک مطالعه توصیفی- مقطعی کلیه نوزادانی که بر اساس برنامه غربالگری بین سالهای ۱۳۸۵تا۱۳۸۹طبق آخرین رفرنس آماری آکادمی طب اطفال امریکا TSH بالای ۱۰میکرواینترنشنال یونیت در سی سی و T4 زیر ۶,۵ میکروگرم در دسی لیتر داشتند و با تشخیص کم کاری مادرزادی تیروئید دردرمانگاه غدد اطفال شهر همدان تحت درمان بودند و اطلاعات مورد نیاز آنها در پرونده وجود داشت به عنوان گروه مورد و ۱۵۰ نوزادی که نه در غربالگری ونه بعد ازآن کم کاری مادرزادی تیروئید نداشته اند و درمانی دریافت نمی کردند به عنوان گروه شاهد انتخاب شدند. متغیرهایی از قبیل سن، جنس، فصل

شود . در صورتی که فنیل الانین ۴ تا ۷ میلی گرم / دسی لیتر باشد و نوع غیر کلاسیک رد شده باشد نیاری به شروع درمان نمی باشد. در صورت فنیل آلانین ۷ تا ۱۰ و در صورتی که مجدداً پس از یک هفته سطح فنیل آلانین بیشتر از ۷ باشد درمان رژیمی شروع می شود . در حین درمان تا سن ۱۲ سالگی سطح قابل قبول فنیل آلانین ۲ تا ۶ و پس از آن ۲ تا ۱۰ در نظر گرفته شده است . در حین درمان سطح فنیل آلانین کمتر از ۲ نیز مطلوب نمی باشد زیرا با عوارض پوستی ، گوارشی و مغزی همراه خواهد بود . در مورد کمبود ساخته شدن کوفاکتور BH4 در نوع کمبود آنزیمی PTPS درمان با BH4 ، ال دوپا و ۵ هیدروکسی تریپتوفان (5HT) و درمورد کمبود آنزیمی DHPR درمان با رژیم ، اِل دوپا ، 5HD و فولینیک اسید خواهد بود.

٪ موارد این بیماری بعلت عدم ساخته شدن و یا recycling کوفاکتور تتراهیدروبیوپترین (BH4) می باشد که بعنوان فرم غیر کلاسیک شناخته می شود که درمان و پیش آگهی آن با فرم کلاسیک کاملا متفاوت است . خوشبختانه از سال ۱۳۸۵ غربالگری PKU در ۳ استان تهران ، مازندران و فارس شروع شده و از سال ۱۳۹۲ تمام کشور تحت پوشش قرار گرفته است . غربالگری در روز ۳-۵ تولد با بررسی سطح فنیل الانین به روش کالری متریک بر روی قطره خون پاشنه پا بر کاغذ فیلتر شروع می شود . در صورت عدد فنیل آلانین بیشتر از ۴ میلی گرم / دسی لیتر جهت تشخیص قطعی خون با روش HPLC بررسی شده و در صورت عدد بیشتر از ۴ ، در قدم اول نوع غیرکلاسیک بابررسی نئوپترین و بیوپترین ادراری و اندازه گیری آنزیم DHPR رد شده و رژیم غذایی فاقد فنیل آلانین و مقادیری از شیر مادر یا شیر خشک شروع می