SKELETAL GROWTH IN UREMIA. B. Krempien, O. Mehls, E. Ritz, University of Heidelberg, GFR,

Skeletal growth (linear apposition rate in diaphyses, longitudinal growth/day and accumulated growth rate in metaphyses) were measured in uremic rats by tetracycline labelling. Cellular proliferation rates were evaluated autoradiographically by 3H-thymidine. The effect of hyperparathyroidism was determined by parathyroidectomy. Growth plates and metaphyseal spongiosa were studied by scanning electron microscopy. Whereas skeletal growth was significantly reduced in uremic rats (Co 16.5±3.1 /u, U 13.1±1.4/u) the proliferation rate of cartilage cells was clearly elevated (3H-index Co 8, 1%, U 13.3). After parathyroidectomy the proliferation rate was markedly reduced in uremic animals (4.2%). Experimental acidosis (NH_4Cl) and urea administration (without renal insufficiency) had no influence on apposition rates. In order to prevent impairment of longitudinal growth in uremia the effects of a long term treatment with vitamin D3, D-metabolites and D-analogs were studied in this experimental model.

EARLY FACTORS IN DEVELOPMENT OF ATHEROSCLEROSIS

EARLY LESIONS OF THE HUMAN ARTERIES IN RELATION TO THE ARTERIAL STRUCTURE. Meyer, W.W. (Mainz, F.R.G.) and Lind, J. (Stockholm). The regular pattern of early gross calcifications which are often present in the iliac arteries of the newborn children and infants depends on definite structural features of the arterial wall. The peculiar pattern of calcifications and the early appearance of the atherosclerotic lesions in the iliac arteries of children with a single umbilical artery also points to the significance of the structural features for the morphological aspect of early lesions. In the large muscular arteries, the gross and microscopic patterns of early calcifications are largely determined by the system of gaps in the internal elastic membrane which appear in an increasing number with forthcoming growth. As could be shown at the common and internal carotid artery, the early lipid deposits are also initially confined to preformed structures of the arterial wall which develop not only at the arterial branchings but also in the straight arterial segments. The combined gross demonstration of the calcific and lipid deposits applied to several arterial segments may be helpful for the evaluation of the interrelation between the early calcifications and early lipids infiltrations.

CAUSES OF DEFECTIVE SKELETAL MINERALISATION IN LOW BIRTHWEIGHT INFANTS. Jonathan Shaw, London.

The ideal postnatal growth of the low birthweight infant should, quantitatively and qualitatively resemble the growth that would have occurred had he remained in utero. Using published data from the chemical analyses of foetal bodies it can be shown that between 24 and 36 weeks gestation calcium accumulates in the foetal body in an exponential menner, and it can be calculated that calcium accumulates at a rate of 120 150 mg per kilogram and day. Using metabolic balance techniques twelve low birthweight infants (29-33 weeks gestation) have been studied continuously for periods of 20-60 days. By comparing the measured calcium retentions with the calculated rate of accumulation in utero it can be shown that low birthweight infants accumulate a gross body deficit of calcium, retaining about 1/3-1/5 of the amount of calcium they would have retained had they remained in utero. Simultaneous fat balances have been performed which confirm the gross malabsorption of fat. The role of fat malabsorption on calcium absorption will be discussed.

MECHANICAL FACTORS IN ARTERIAL DEVELOPMENT, THEIR RELEVANCE IN ATHEROGENESIS. C.L. Berry

The elastic laminar structure of the media of large arteries develops in response to tangential stress. It is modified at branches and bifurcations by rapid changes in tension, and may be altered by induced hypertension during growth, and by interference with the cellular development of vessels. Such changes alter the elastic performance of the aorta, and may predispose to the development of atheroma.

EXCESSIVE THYROTROPIN RESPONSE TO THYROTROPIN RELEASING HORMONE (TRH) IN PSEUDOHYPOPARATHYROIDISM (PHP) AND HYPOPARATHYROIDISM (HP).
E.A. Werder, R. Illig, J.A. Fischer, U. Binswanger, A. Fanconi, P. Sigg, G. Murset, S. Bernasconi, H.P. Kind A. Prader (Zurich) and G. Ponchon A. Malvaux (Louvain)

In all of 10 cases with PHP (3 adults, 3 adolescents and 4 children from 5 families) intravenous TRH evoked excessive plasma thyrotropin responses as seen in mild primary hypothyroidism. A similar response was found in 4 among 6 cases with HP (1 adolescent and 5 children from 5 families). In none except 2 cases were clinical signs or other laboratory data suggestive of hypothyroidism. The diagnosis of PHP or HP was ascertained by the determination of immunoreactive serum parathyroid hormone and/or of urinary cyclic adenosine 3' 5' -monophosphate after intravenous infusion of parathyroid extract. TRH did not induce significant changes of serum parathyroid hormone concentration in any of 8 cases (6PHP, 2HP) tested.

EARLY FACTORS IN THE DEVELOPMENT OF ARTERIOSCLEROSIS: EPIDEMIOLOGICAL FACTORS. Frederick H. Epstein, University of Michigan, Ann Arbor, Michigan, U.S.A.
It is now accepted that prevention of atherosclerosis should start early. Habits, both healthy and harmful, become engrained early; from this point of view alone, "early" probably means "pre-school" and by parental precept. In terms of the genesis of the lesions, the matter is less simple because differences in the extent of arterial involvement between geographic areas which may be related to environmental influences become marked only beyond the teens. The timing of conversion from fatty streaks to early plaques is therefore critical, as is the disputed question of plaque formation de novo. The time course of "risk factor" levels in childhood (lipids, glucose, blood pressure, obesity) is, presumably, intimately and causally related to the events in the arterial intima. These temporal trends and the difficult question of what constitutes risk factor elevation in youth may be studied by geographic comparisons, longitudinal observations on cohorts of children or measuring the degree of resemblance in risk factor levels between parents and their offspring. Demonstrating that children with upper-range risk factor levels are more apt to have parents with coronary heart disease would also help in the early recognition of risk. Data to be presented & discussed.