
The metabolic processes responsible for skeletal calcification revolve around the problems of calcium and phosphorus absorption and excretion, and the maintenance of the levels of these substances in the blood. The unravelling of these problems has always advanced as much by the study of rickets as from a direct study of ossification in healthy bone. This monograph, a university M.D. thesis, summarizes the modern concepts of these processes against an exhaustive and critical review of the literature (some 500 references are listed) supported by the author's own clinical and experimental observations in cases of primary resistant rickets and of the de Toni-Fanconi syndrome. The observations were designed to elucidate specific points regarding calcium metabolism and serum phosphate regulation and tubular reabsorption, around which so much that concerns bone formation appears to revolve.

In the first few sections the author traces the radical changes that have come over our ideas on the mineralization of osteoid; how the older ideas of precipitation from a supersaturated solution of minerals, and the importance of phosphatase, have become outdated and given place to the idea of crystallization of hydroxyapatite of calcium on to an organic, preformed, mucoprotein template. The rest of the monograph discusses extensively the biochemical and clinical aspects of the activity of vitamin D in relation to rickets, the extremely complex relationships that exist between calcium, phosphate, the renal excretion and retention of these two substances, the actions of vitamin D and parathyroid, and the rate of both calcification and the removal of mineral salts from bone.

With regard to the role of the renal tubules in the production of resistant rickets, whether primary or in association with amino-aciduria and glycosuria, he discards the theory of a phosphate diabetes, a primary failure of reabsorption of phosphate by the renal tubules as too simple and even misleading, and suggests that there is a failure at some point in the metabolic merry-go-round in which an equilibrium is normally maintained between (1) the availability of minerals for calcification; (2) the rate of calcification; (3) the serum phosphorus level; (4) the tubular reabsorption of phosphate; and (5) the solubility of bone salt. He considers that clinically the availability of calcium is probably the main conditioning factor in this equilibrium.

In the introduction the author complains, perhaps rightly, that clinicians are comparatively ignorant of the physiology of calcium and phosphorus metabolism, and he quotes Howard as stating that 'in the field of modern medical investigation, the clinician usually is placed at the bottom of the totem pole, beneath his colleagues versed in the basic science... though his opportunities for viewing the subject in its broadest sense are apt to be greater than those of the biochemists or physicists'.

Anyone willing and still able, for it is tough going, to spend a long week-end reading and digesting this monograph will find his grasp of the complications of calcium and phosphorus metabolism brought firmly up to date, and the boundaries of his biological thinking considerably widened.

This treatise first gives a critical review of the literature on the theories of the closure of the ductus arteriosus. There are some valid criticisms of the views of Barcroft and his colleagues; no mention is made of the work of Patten (1933), whose conclusions were the same as the authors'; and the more recent contributions of Adams and Lind (1957) and Dawes and his colleagues (1954) to our knowledge of the physiology of the foetal and neonatal circulation are not discussed.

There follows a description of the authors' morphological and experimental studies of the time of closure of the ductus in guinea pigs, which includes the effect of sudden interruption of the blood flow through the ductus and the pulmonary artery in the foetus and newly born animal, and also some angiographic studies. Their findings support those of Patten and point to a gradual development of the circulation through the lungs during foetal life, the pulmonary flow increasing as the ductal flow decreases. No light is thrown on the exact mechanism of closure of the ductus, but the authors believe it to be a gradual process.

There are interesting observations of the varying size of the ductus relative to the pulmonary artery at different stages of foetal development which may be significant in relation to differences in size and shape of patent ducts found in infants and children at operation and may give a clue to the time of a possible foetal insult responsible for the condition.

The study will be of particular interest to cardiologists and also to pathologists, physiologists and anatomists interested in this field.

References

This book is beautifully produced and refers to Grulee's collection of over 4,000 publications which were given to the John Crerar Library in Chicago.
Anyone interested may consult the book in the library of the B.M.A.