Abstracts of Recent Publications of the Professional Staff of the Henry Ford Hospital and the Edsel B. Ford Institute for Medical Research

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ABSTRACTS OF RECENT PUBLICATIONS OF THE PROFESSIONAL STAFF OF THE HENRY FORD HOSPITAL AND THE EDSEL B. FORD INSTITUTE FOR MEDICAL RESEARCH


The effects of ferric ions and cholic acid on the mobilization of accumulated liver cholesterol have been studied in the albino mouse. It was found that dietary ferric ions do not increase rate of liver cholesterol mobilization. Mobilization of elevated liver cholesterol is prevented by addition of dietary cholic acid. Evidence is presented which suggests that cholic acid absorption is not prevented by dietary ferric ions.


The positive diagnosis of primary hyperparathyroidism is at times very difficult and is dependent on laboratory determinations. The reported levels of serum calcium and phosphorus may be equivocal or inaccurate and vary with dietary intake of calcium and phosphorus and other factors. Other conditions can produce variations in serum calcium and phosphorus which simulate those in hyperparathyroidism. The tubular reabsorption of phosphorus, phosphate deprivation, and intravenous calcium-load tests are of confirmatory value in the diagnosis of this condition. The test for tubular reabsorption of phosphorus appears at this time to be the most definitive of these tests.


The losses of weight and nitrogen, produced by daily doses of corticotropin (20 units), hydrocortisone acetate (15 mg.), and prednisone (10 mg.), were studied in normal bitches receiving a constant amount of food equal to that which before therapy had either maintained or permitted it to increase slowly. Loss of weight during therapy was accompanied by a decrease in the difference between water intake and urine volume, regardless of whether water intake rose or fell. Weight was restored fairly soon after cessation of therapy with prednisone, but not after corticotropin or hydrocortisone. The probability that calorigenic effects of these substances were involved is discussed. Aspirin (20 grains daily) increased nitrogen output, but weight as well as the difference between water intake and urine volume, increased. The pattern of response to each of the compounds, was, in general, quite similar, but varied in detail in different animals or experiments. Effects of applying hydrocortisone ointment to effected areas in a bitch with dermatitis are also recorded. Prompt improvement was accompanied by losses of weight and nitrogen. Other instances in which the local and general effects of a hormone appear to be contradictory are cited.

*From Edsel B. Ford Institute for Medical Research.
Abstracts


Success with operations for the relief of urinary stress incontinence varies from 70 to 90%. Urethro-cystographic studies have demonstrated the prime importance of reconstitution of the vesical sphincter mechanism if vaginal plastic operations are to relieve this condition successfully. Suprapubic sling operations utilize an equally important general principle: elevation of the urethrovessical junction to a high retropubic position so as to lessen hydrostatic stress on the damaged sphincter. Many prostheses have been tried in a search for the ideal material for use as an elevating sling. Recently use of the anterior vaginal wall as in the technique of Marshall, Marchetti, and Krantz has gained wide acceptance due to the relative simplicity of technique and high degree of success. Certain conditions, however, limit the effective utilization of the anterior wall. As an alternate method of achieving adequate sphincter elevation, a composite suprapubic technique utilizing the round ligaments is described. It has proven successful in 12 cases of severe stress incontinence.


The poor prothrombin consumption test supported by thrombocytopenic serum has been shown in a previous publication to be due to some activity other than prothrombin — a thrombocytopenic activity. This thrombocytopenic factor or activity can be readily adsorbed on inorganic agents and eluted. The autoprothrombin I values were found to be lower in thrombocytopenic serum than in normal serum. When the patient with thrombocytopenia is treated with aminopterin the prothrombin consumption test remained short while the autoprothrombin I values increased to that of normal serum and then fell again as the treatment was withdrawn. The prothrombin in the serum remained uniformly low throughout the treatment. The relationship of the thrombocytopenic activity and autoprothrombin I as possible derivatives of prothrombin is considered.


All preparations of succinic dehydrogenase from beef heart tested, whether soluble or particulate, can be rendered more active by incubation with substances which combine with the active center. The efficiency of malonate, succinate, and phosphate as activators is related to their apparent affinity for the enzyme, as measured by $K_I$ and $K_m$ values. The activation follows a first order reaction and its rate is profoundly affected by temperature. At 0° the process is not measurable and at 38° is very rapid. The activation energy of the process is 35,600 calories mole⁻¹. The increase in activity is accompanied by characteristic changes in the absorption spectrum and small but significant changes in the Michaelis constants for the substrates. The process has been interpreted as a configurational change in the enzyme from a less to more active form.

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The closure of ventricular septal defects became possible when methods of bypassing the heart by cross-circulation with human donors and with mechanical pump-oxygenators became available. Originally, these operations were done on the beating heart and the presence of coronary sinus blood and the motion of the heart increased the technical difficulties. Induced cardiac arrest has appeared to be a valuable adjunct in the repair of these septal defects as well as in other intracardiac operations.

Following experimental work with potassium solution and acetylcholine as cardioplegic agents, we adopted the latter. The drug is injected proximal to a clamp on the aorta so that it enters the coronary arteries. The heart is started by removing the clamp to permit the perfusion of oxygenated blood into the coronary arteries.

This technic has been used in 53 operations for the closure of ventricular septal defect. In the favorable group of patients over the age of 3 years, with adequate pump-oxygenator flows, the mortality has been only 5 per cent.


The reversibility of succinic dehydrogenase from yeast and animal tissues has been demonstrated by the constancy of the ratio of activities in the forward and reverse direction from mitochondrial preparations to the highly purified, soluble enzyme and by inhibitor studies. Succinate and malonate are effective competitive inhibitors of the fumaric reductase activity of succinic dehydrogenase. The $K_m$ and $K_i$ values for succinate, fumarate, and malonate in the forward and reverse reactions of the beef heart enzyme have been determined. A differential effect of aging on the succinic dehydrogenase and fumaric reductase activities of the enzyme has been demonstrated and interpreted in terms of different reaction mechanisms operating in the two catalytic activities. Data in the literature on unidirectional fumaric reductases have been reinterpreted in the light of present knowledge of succinic dehydrogenase. A scheme has been presented for the reaction sequences operating during the events of electron transport catalyzed by succinic dehydrogenase.


It is believed that idiopathic thrombopenia has an immunoallergic basis. There are two forms of the disease, acute and chronic, and the clinical picture and laboratory findings are distinct. Most patients with acute ITP can be successfully treated with ACTH or cortisone. Those with acute ITP in whom there is an incomplete response

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to steroid therapy and those with the chronic form of ITP are subjected to splenectomy. The patients are prepared for operation with ACTH or cortisone.

Successful treatment depends on accurate diagnosis to exclude other forms of thrombocytic purpura. Careful medical observation and vigorous ACTH and cortisone therapy have reduced the need for splenectomy.

A series of 62 adequately treated cases of ITP are cited in which there was only one death, that of a patient who refused splenectomy after cortisone failed to produce an adequate response. In two cases there was only temporary improvement with combined steroid therapy and splenectomy, but symptomatic control was achieved by long-term cortisone therapy. It appears that cortisone gives more satisfactory results than hydrocortisone or prednisone.


In the nonlactating breast the manifestations of inflammation are varied and the responsibility for the management of them is divided among several specialties. Acute infections that involve the subareola present a special problem because they tend to involve the ducts, primarily or secondarily and because they tend to recur unless the effected portion of duct is removed. Tuberculosis of the breast is no longer common but when it occurs it has a characteristic appearance. Fat necrosis which is a result of injury may appear as an inflammation at one phase of its development and later may simulate malignancy. Traumatic mastitis, a mild inflammation of the breast in response to repeated slight trauma, occurs most frequently during the reproductive years and also may be mistaken for infection or malignancy. Although this lesion is tender it lacks other signs and symptoms of infection and differs from malignancy in that it is always tender and usually is discovered because of tenderness. Protection from further trauma reduces the size of the lump while malignancy is not reduced by protection. The patient is usually aware of the source of trauma, which most commonly is point or line pressure of a bra. Chronic cystic mastitis and inflammatory carcinoma of the breast deserve mention because they too may be confused with infections.


A family with an unusual incidence of cholelithiasis and possible associated pancreatitis was studied. The patients with cholelithiasis had an associated elevation in serum cholesterol and one of these had an increase in other components of the serum lipid fraction. The patients with pancreatitis had normal serum lipid levels.

Recent studies dealing with factors which appear to be important in the formation of gallstones are reviewed in relation to the patients presented.


Aluminum hydroxide gels are used as adsorbents for proteins, enzymes and viruses, particularly for preparing vaccines against foot-and-mouth disease.

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The structure and composition of Wislicenus' fibrous alumina was studied by solubility in acids, birefringence, water content, aging in water, x-ray and electron diffraction and by electron microscopy. It was found that fibrous alumina is constituted mainly of amorphous aluminum hydroxide and contains some adsorbed water and some aluminum oxide. The birefringence of the fibers was due to the existence of non-crystalline fibrils of various lengths and about 70-80 A.U. diameter, which were more or less well oriented parallel to the length of the fiber. Amorphous particles, arranged linearly, approx. 50 A.U. in diameter were found to be the ultimate building blocks of these fibrils. These fibrils were often observed to lie together in bundles or fibers about 200-300 A.U. across. Sometimes such groupings of the fibrils did not exist but the whole macroscopic fiber seemed to be composed of an oriented bundle of fine fibrils. The binding between particulates in a fibril and between fibrils was very weak. This fact may account for the low density of the material. It has been shown that the formation of fibrous alumina is dependent on the existence of a small amount of water and a small amalgamation on distinct spots on the aluminum surface. The mechanism of the formation of fibrous alumina is suggested as similar to that of anodic films on aluminum. It was observed that strongly amalgamated aluminum or aluminum amalgam itself did not produce fibrous alumina even in air, but formed a grey powder of which the main component was mercuric oxide and aluminum.