Renal Pain of Vascular Origin

Pain of renal origin is usually colicky, and is most commonly associated with the passage of renal stones or of blood-clots. This pain frequently radiates from the loin to the groin, causes marked restlessness, and comes in waves. But sometimes in these cases there is also in the background a dull backache or loin pain. It is thought to be due to urine seeping into the retroperitoneal tissues through the pyelo-sinus space. This is usually associated with abdominal distension by gas, and often these patients come to laparotomy because of the mistaken diagnosis of obstructed bowel. The meteorism is probably due to a paralytic ileus.

Renal pain also occurs from acute or intermittent distension of the pelvi-calicine systems, and this type of pain can be brought on by a water load. The loin pain which may be associated with ureteric reflux is of a similar nature, but occurs during micturition. It now appears that pain due to distension can also occur when only a limited part of the kidney is affected, and the cause of this may be found in the complexity of the renal anatomy.

The close proximity of the renal arteries and their branches to the pelvi-calicine systems can produce various radiological abnormalities resulting from pressure. These tend to be linear and can usually be obliterated by the use of abdominal compression during an intravenous pyelographic examination. By the use of the arterio-pyelogram the effects on the pelvi-calicine patterns can be shown to be due to the arteries running across the pelvi-calicine structures. Till now this has largely been a matter of academic interest, but it was occasionally of importance in that these appearances could be mistaken for tumours. Now, however, it has been shown that obstruction can be produced by a major calix being compressed between two adjacent arteries.

This gives rise to pain in the loin and can be cured by reconstructive surgery or by ligature and section of one of the arteries. A further case is reported by Dr. F. Stare at page 98 of the B.M.J. this week. The localized hydro nephrosis is cured, as is the pain. The nephralgia came on in the third decade of life in two of the cases described, in the fourth in one, and in the fifth in the other. If the underlying cause is a morphological variation, it is odd that the onset of symptoms was so late. Possibly arterial degeneration, renal ptosis, or rotation may play a part.

This condition shows on a pyelogram as an excrinsic pressure groove over the major calix of the upper pole and on retrograde examination by the trapping of the contrast medium in this calix on the film taken with the patient upright. It can probably also be shown on intravenous pyelography, particularly if a "wash-out" technique is used. There is another common site of vascular compression on the urinary tract, and that is on the right ureter at the level of the upper part of the sacrum where it is grooved by the right common iliac artery. At present the evidence is no more than suggestive that this can be a cause of renal pain.

The close physical association of the renal arteries, pelvi-calicine systems, veins, and lymphatics in the renal pelvis and in the kidney substance may possibly lead to other pathological states. Localized venous or lymphatic stasis is thus also a possibility, though as yet undescribed.

Diseases Caused by Cytomegaloviruses

Cytomegaloviruses belong to the same group of viruses as herpes simplex. Particles of cytomegalovirus and herpes simplex virus are identical when seen under the electron-microscope, and the two share other properties such as a tendency to cause latent and symptomless infection. People infected with cytomegalovirus excrete the virus in their urine and saliva and excretion usually lasts for a long time—often for several months. Rather surprisingly, excretion of virus continues despite the presence of circulating antibody.

The growth of cytomegaloviruses in tissue culture was first reported in 1956 and infection can now be diagnosed fairly easily in the laboratory by isolation of the virus in tissue culture or by detection of antibodies by complement fixation test. As a result much more is becoming known about the pathogenic properties of these viruses. Like most viruses, cytomegaloviruses cause disease more readily in children than in adults. This is particularly marked in the case of cytomegaloviruses, which are known to cause severe disease in newborn infants but which have until recently been regarded as almost incapable of causing disease in healthy older children and adults.

Congenital infection is the most severe form of cytomegalovirus infection. The virus is transmitted to infants from their mothers, who have symptomless infection. As with rubella, the effects on the foetus are more serious if the infection is acquired early in pregnancy. The infection is generalized, and the infants are born with hepatosplenomegaly, thrombocytopenia, and jaundice. The most severe effects are on the central nervous system; microcephaly, mental retardation, and other cerebral disturbances are common. In the United States 34 (81%) of 42 affected infants had neurological sequelae, the majority being mentally retarded. A recent study in Melbourne, however, has suggested that the prognosis may not be so grave, and of 20 babies congenitally infected with cytomegalovirus nine showed apparently normal mental development. In addition to neurological disease, pneumonia, chorio-retinitis, and congenital anomalies have been described.

The most constant feature of congenital infection with cytomegalovirus is hepatomegaly. This is due to hepatitis, and cytomegalovirus infection should be suspected in cases of neonatal hepatitis. Cytomegaloviruses have a particular tendency to attack the liver and it is now clear that this form of viral hepatitis is seen in older children as well as in neonates. J. B. Hanshaw and his colleagues in Rochester, U.S.A., isolated cytomegalovirus from 9 (39%) of 23 children with unexplained hepatomegaly or other signs of chronic liver disease. Perhaps more striking was the finding in a survey of asymptomatic children that 20 were found to be excreting cytomegalovirus and no fewer than 14 of these had hepatomegaly: 17 of 19 tested also had abnormal liver function tests. These results suggest that cytomegaloviruses can cause hepatitis in children as well as in neonates. The association of cytomegalovirus infection with liver disease in childhood has been noted by other workers and virus has been isolated from the liver of a 19-year-old girl who died of postnecrotic cirrhosis.

Adult disease due to cytomegaloviruses seems to be relatively rare. However, there is now evidence that the viruses may give rise to a form of infectious mononucleosis in adults. E. Klemola and L. Kääriäinen in Finland described the cases of four adult men—and one female child—who had...
an illness resembling infectious mononucleosis and who were found to have rising titres to cytomegalovirus.14 The patients had fever for two to five weeks and had abnormal lymphocytes in the blood. Liver function tests were abnormal in all five patients. The Paul-Bunnell test was negative and there was no lymphadenopathy or pharyngitis. Three similar cases in Britain have been described in which hepatitis was the presenting feature.15 Four other cases were subsequently reported from Finland in which infectious mononucleosis developed after transfusion with fresh blood.16 Two of the cases followed open-heart surgery and in all four patients a rise in titre of antibodies to cytomegalovirus was shown. Cytomegalovirus was isolated from the urine of one patient. The suspicion is that the virus was transmitted via the blood used for transfusion. Since the infection was associated with fresh rather than refrigerated blood it is possible that the usual refrigeration process inactivates any cytomegalovirus which may be present in blood stored in the usual way.

The development of antibodies to cytomegalovirus at the time of illness is good but not incontrovertible evidence that the virus has caused the disease. Isolation of cytomegalovirus is less easy to evaluate, since these viruses are often excreted over long periods of time and since symptomless infection is common.17 It is therefore difficult to decide whether the virus is the primary cause of the disease or merely present as a coincidental infection. Cytomegaloviruses are also "opportunistic" in that they have a particular tendency to infect patients who are already suffering from some debilitating disease.20 Chronic pulmonary disease due to cytomegalovirus has been described in two adults suffering from hypogammaglobulinaemia and thymoma,21 and ulcerative lesions in the gastrointestinal tract have been reported in four adults who had pre-existing alimentary disease.22 Disseminated infection is sometimes seen as a terminal event in severe illness.23 The report of a patient who died of cytomegalovirus pneumonia after renal transplantation illustrates that the virus may occasionally be a hazard in this field also.24

No doubt with increasing availability of laboratory diagnostic techniques infection with cytomegaloviruses will be reported more often. In the meantime cases of hepatitis in both children and adults should be investigated for cytomegalovirus infection—which should also be suspected in cases of infectious mononucleosis in which the Paul-Bunnell reaction is negative.

Effects of Nicotine

All confirmed smokers know that smoking is pleasurable, but there is no consensus of opinion on why this is so. A recent symposium1 has reviewed current opinion among experts on the pharmacological basis of the habit, but there are still many questions to be answered. Much attention has been paid to the chemical analysis of condensates of tobacco smoke produced from various samples of leaf burned under varying conditions, particularly with a view to isolating any putative carcinogen. Nevertheless, the chief pharmacologically active constituent is the alkaloid nicotine, of which 50–150 μg is absorbed on each inhalation of a puff of cigarette smoke,2 and ultimately two to three times more if the cigarette is smoked to the last gasp. This is equivalent to an intravenous dose of 1–2 μg/kg body weight. Formerly the gross descriptive pharmacology of a drug such as nicotine consisted of a series of discrete collections of phenomenon, and there seemed to be little connexion between the various groups of actions described. Thanks largely to progress made by recording electrical activity in single cells or groups of cells while applying drugs by micropipettes and iontophoresis it is now possible to recognize and describe an underlying unity in all the actions of nicotine. Ever since the days of J. N. Langley3 it has been known that nicotine first stimulates and then paralyses the tissues on which it acts. W. D. M. Paton and W. L. M. Perry4 showed that in ganglia nicotine blockade took the form of an initial stimulant effect—similar to that of atropine—followed by persisting depolarization and that these are extensions in time of the same fundamental action.

Two alkaloids—arcoline found in betel nut and nicotine found in tobacco—are widely used to affect mood. Both have neuropharmacological activity, but the effects of nicotine are exerted at certain sites only and are abolished by one group of drugs (of which tubocurarine is an example); the effects of arcoline and the related alkaloid muscarine are exerted at other sites and are abolished by another group of drugs (of which atropine is the best-known example). For these reasons Sir Henry Dale5 classified the actions of acetylcholine as nicotinic and muscarinic, and it now appears probable that the distinction applies to muscle (skeletal muscle, nicotinic; smooth and cardiac muscle, muscarinic); to postsynaptic peripheral autonomic nerve (postganglionic parasympathetic, muscarinic; preganglionic, predominantly nicotinic but with muscarinic elements); and to the central nervous system,6 where both exist.

The disturbing effect of nicotine on cell membranes produces a wide spectrum of primary and secondary effects. Small doses of the alkaloid stimulate the central nervous system in a variety of ways. In animals it is possible to show by the use of isotopically labelled nicotine that the unchanged alkaloid is located in the brain in relatively high concentrations within a few minutes of intravenous injection, and that amounts comparable to those likely to be absorbed during inhalation of tobacco smoke stimulate the brain-