The results have shown that adrenaline, noradrenaline, 5-hydroxytryptamine, and histamine are powerful venoconstrictors; while nitrites and isopropylnoradrenaline dilate the venous system (see Table).

Several substances, such as adrenaline and histamine, have a dissociated action on arteries and veins, dilating the former and constricting the latter.

Summary

A method is described for measuring changes in tone of forearm veins. The rate of venous pressure rise and volume increase in a segment of forearm were recorded simultaneously when a proximal collecting-cuff was inflated. The results were expressed as $\frac{\Delta P}{\Delta t} / \frac{\Delta V}{\Delta t}$ in arbitrary units of mm. Hg pressure per ml. inflow, and defined as "venous tone" of the forearm; an increase in this ratio indicating constriction and a decrease indicating dilatation. The errors of the method and those of confirmatory methods, such as pressure changes in isolated venous systems, are discussed.

Reflex constriction of the normal peripheral venous system occurred on tipping into the erect posture, with the Valsalva manœuvre, and with large venesections. Reflex venodilatation followed large cough transients. These effects were abolished when the reflex pathway was interrupted. Venodilatation followed the administration of intravenous ganglionic blocking agents, indicating that there is some resting tone in forearm veins.

In heart failure, venous tone was increased, often conspicuously, and fell towards the normal level (1–3 mm. Hg/ml.) on treatment. In severe anaemia, venous tone was also increased though the arteries were moderately dilated; the critical level of haemoglobin was 40%, and the plot of venous tone increase against haemoglobin decrease bore a resemblance to the plot of cardiac output against haemoglobin. In severe beriberi the venous system was constricted in spite of maximal dilatation of the arteries.

Adrenaline, noradrenaline, 5-hydroxytryptamine, and histamine were powerful venoconstrictors. Nitrites dilated the venous system, as did isopropylnoradrenaline.

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THE DANGEROUS VAGINAL PESSARY

BY

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Since January, 1957, 13 patients have been admitted to the Royal Victoria Infirmary with serious pelvic complications associated with the prolonged use of vaginal ring or cup-and-stem pessaries. There have been six cases of primary cancer of the vagina, five of severe chronic ulceration of the vaginal walls, and one case of vaginitis complicated by fulminating pelvic cellulitis, and in one patient a pessary had ulcerated into the bladder and rectum, causing large fistulae; this patient died. Brief case histories are given.

Case Reports

Case 1.—A 55-year-old patient was admitted to the gynaecological ward in January, 1957, with a history of slight irregular vaginal bleeding since the menopause two years previously. During the six weeks prior to admission the blood loss had been continuous. For nine years she had suffered from prolapse, and during this time had worn a vaginal ring pessary which had seldom been changed. On examination she was found to have a crescent-shaped primary cancer of the vagina involving the posterior fornix and the right wall of the vagina. The growth followed exactly the line of contact between the pessary and the vaginal wall.

Case 2.—A 74-year-old widow was admitted to the gynaecological ward in July, 1958, for investigation of post-menopausal vaginal haemorrhage. She had worn a ring pessary for prolapse for over 40 years. She could not remember how often the pessary had been changed, but it had finally been removed by her general practitioner in March, 1958, because of vaginal discharge. On examination she was found to have a horseshoe-shaped cancer of the vagina involving the anterior and both lateral walls. The surrounding tissues were oedematous and infected.

Case 3.—A 66-year-old widow was admitted to the gynaecological ward in February, 1958, for investigation of post-menopausal bleeding. She had worn a ring pessary for prolapse since 1948. To begin with she had changed the pessary regularly, but since 1950 she had left it in the vagina for several months at a time. She periodically douched the vagina, and in January, 1958, noticed that the fluid was blood-stained. She consulted her doctor, who referred her to hospital. Pelvic examination revealed an ulcerating cancer of the vagina involving the posterior fornix and the right upper half of the right vaginal wall.

Case 4.—An 84-year-old woman was admitted to the gynaecological ward in July, 1958, for investigation of post-menopausal bleeding. For 10 years she had worn a ring pessary for prolapse. She had changed the pessary every two or three months but had finally removed it in May, 1958, when she noticed vaginal bleeding. Examination revealed an extensive cancer of the vagina involving the posterior fornix and extending round both lateral walls almost as far as the urethra.

Case 5.—A 75-year-old widow was admitted to the gynaecological department because of vaginal bleeding in October, 1958. For 20 years she had worn a ring pessary for prolapse, and it had been changed every two months by the district nurse. Examination under an anaesthetic revealed a crescent-shaped cancer involving the posterior fornix and right vaginal wall.

Case 6.—A 77-year-old widow was admitted to the gynaecological ward in May, 1961, with a two-months history of foul vaginal discharge and occasional slight bleeding. For 50 years she had worn a ring pessary to control a prolapse. She had changed the pessary regularly herself every month; it was last changed a fortnight before admission. On examination she was found to have a crescentic cancer of the upper vagina involving the posterior fornix and both lateral walls.

Case 7.—A 71-year-old widow was admitted to the gynaecological ward in August, 1959, for investigation of a purulent-smelling vaginal discharge. Nine months before admission she had been given a ring pessary to control a prolapse; the pessary had never been changed. Once the pessary had been removed she was found to have a circular ulcerating vaginitis involving the upper half of the vagina. Resistant *Staphylococcus aureus* was grown from the vaginal discharge.

Case 8.—A 61-year-old widow was admitted to the gynaecological department in September, 1960, for investigation of post-menopausal bleeding. For 17 years she had worn a ring pessary to control a prolapse. The pessary had been changed regularly at a local women's welfare clinic. A foul-smelling pessary was removed from the vagina, and examination showed a swollen oedematous and ulcerated posterior fornix and cervix. The clinical appearance suggested malignancy, but biopsy revealed only chronic infection.

Case 9.—An 88-year-old widow was admitted to the gynaecological department in August, 1960, after a brisk vaginal haemorrhage. Vaginal examination revealed a ring pessary which had not been changed for 30 years; the patient had quite forgotten that it was in the vagina. An ulcerating vaginitis involved the posterior and right vaginal fornices, and there was an offensive discharge. The condition was non-malignant.

Case 10.—A 68-year-old patient was admitted to the gynaecological department because of post-menopausal bleeding. She had suffered from pernicious anaemia for many years but was in good health. A ring pessary had been worn for 25 years on account of prolapse. She had changed the pessary every two months, but on the last two occasions had noticed blood on the pessary. A large infected ulcer was found in the posterior fornix extending half-way down the right wall of the vagina. Clinically this appeared to be malignant, but biopsy showed only chronic infection. This patient's family doctor did not know that she was wearing a pessary; it had been inserted originally by a general practitioner in another part of the country.

Case 11.—A 70-year-old patient (with moderately severe mitral stenosis) was admitted to a surgical ward in the hospital in March, 1957, with a strangulated femoral hernia. She was wearing a Napier cup-and-stem pessary and was noted to have a profuse vaginal discharge. The house-surgeon was unable to remove the pessary and sought the help of a gynaecologist; he too failed to remove the pessary. In the theatre, prior to the surgical operation, the patient was placed in the lithotomy position and examination showed a complete procidentia with the cup portion of the pessary firmly incarcerated in a huge oedematous and infected cervix. The pessary had to be cut out of the cervix. Convalescence was complicated by a severe staphylococcal infection of the vaginal vault. It was learned afterwards that the pessary had not been changed for nine months. Eight weeks after the emergency operation a huge procidentia was repaired by Le Fort's technique.

Case 12.—A 78-year-old widow was admitted to a surgical ward with acute lower abdominal pain in February, 1957. Because of an offensive vaginal discharge a gynaecological opinion was sought. Pelvic examination revealed a firm constriction half-way up the vagina—the area was ulcerated and infected and bled easily. A provisional diagnosis of cancer of the vagina was made. In the theatre, with the patient under general anaesthesia, examination showed a bone ring pessary embedded in the vaginal wall. The pessary had to be removed piecemeal with a bone forceps. The vaginal wall and surrounding cellular tissues were heavily infected, and a tender brawny swelling stretched out on either side from the cervix. The patient, in fact, had an acute pelvic cellulitis secondary to infection surrounding the vaginal pessary. She later admitted that she had quite forgotten about the pessary, and calculated that it must have been in position for at least 26 years.

Case 13.—A 77-year-old widow was admitted to the gynaecological ward in September, 1959. The day before admission she had sent for her general practitioner and had told him that she was having pain on micturition and was constipated. She told him—for the first time—that she was wearing a vaginal pessary which had been given to her by a nurse 18 years previously. The doctor made a vaginal examination and found a densely adherent old-fashioned "shelf" pessary. The vagina contained blood and a foul-smelling discharge. The patient's general condition was poor. The pessary had to be removed under anaesthesia in hospital. She was then found to have a vesico-vaginal fistula 7 by 2 cm. and a recto-vaginal fistula 3 by 2 cm. The openings into the bladder and rectum gradually decreased in size, and six weeks after admission a colostomy was performed in order to keep the vagina clean. An attempt was made to close the vesico-vaginal fistula in February, 1960, but the extent of the damage was too great and it was regarded as impracticable. The ureters were transplanted into an isolated loop of ileum by a genito-urinary surgeon in March, 1960, but the patient developed a right hydronephrosis and an acute pyelonephritis. She died in May, 1960.

In these cases the distribution of the vaginal cancer or ulcerating vaginitis followed closely the area of contact between pessary and vaginal wall. It is likely that long-standing trauma and infection contributed to the development of the lesions.

Discussion

The vaginal pessary is one of the oldest of all medical instruments, and no one knows when it was first used in the treatment of prolapse. Numerous patterns, designed in a variety of materials, were used quite widely in the eighteenth and nineteenth centuries. With better understanding of the anatomy of prolapse and with the development of modern surgical and anaesthetic techniques the use of the pessary has declined steadily in the last 50 years. Considering the serious complications that may arise it is doubtful whether there is now any place for vaginal pessaries in the management of prolapse. It is not uncommon for patients to forget that there is a pessary in the vagina, and this is especially liable to happen in the elderly (Pritchard, 1961). In Cases 10 and 13 the patients had moved from one area to another and had omitted to tell their new doctors that a pessary was being worn; neither thought it necessary to have medical supervision until ominous signs appeared. Most of the 13 women had changed their pessaries regularly and frequently, but this had not prevented the development of vaginal lesions. The continuing pressure of a foreign body is sufficient to set up a chronic irritation in the vaginal squamous epithelium. Whether this leads to infection or malignant change appears to be a matter of individual susceptibility.

Since January, 1957, there have been eight cases of primary cancer of the vagina in this clinic. Six of the eight women (Cases 1 to 6) had worn ring pessaries for many years, and the distribution of the cancer suggested that chronic irritation from the pessary was an important

aetiological factor. The seventh woman had a carcinoma superimposed on an excoriated, infected procidentia, but there was no apparent contributory factor in the eighth case. The numbers are small, but this experience does suggest that the vaginal ring pessary is an important preventable cause of cancer of the vagina.

With one exception there were no contraindications to surgical treatment in the 13 cases. In Case 11 the patient had a moderately severe mitral stenosis, but the emergency operation for relief of a strangulated hernia was undertaken without difficulty, and she subsequently had Le Fort's operation without complication. This case illustrates the usefulness of Le Fort's procedure in severe cases of prolapse when the patient, through age or some medical disability, is thought to be a poor surgical risk. When subsequent patency of the vagina is not important this simple procedure has a number of advantages over the Fothergill repair (Vartan, 1960; *Lancet*, 1961). The anaesthetic requirements are less, the operation can be done in a few minutes, and there is less disturbance of cellular tissue and bladder. The patient can be up and about in 24 hours, and, in my experience, convalescence is smoother and speedier than after a Fothergill-type operation. Many general practitioners have never heard of the operation, and a surprising number of gynaecologists have had no personal experience of it. The few patients on whom I have thought it necessary to perform this operation have been well pleased with the result and have been spared the misery and possible complications associated with prolonged wearing of a vaginal pessary.

Conclusions

Prolonged use of vaginal ring or cup-and-stem pessaries may lead to cancer of the vagina, ulcerative vaginitis, and fistulae. The clinical histories are given of 13 patients admitted to the Royal Victoria Infirmary since January, 1957.

In view of these important complications it is suggested that there is no place in modern gynaecological practice for vaginal pessaries in the management of prolapse.

For severe degrees of prolapse in elderly and infirm patients Le Fort's operation is preferable to the use of vaginal pessaries.

I am indebted to Mr. Frank Stabler for permission to publish details of patients admitted under his care (Cases 2, 8, 9, and 13).

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Plans for a dental health campaign are being discussed by the local authorities of Edinburgh, Midlothian, Peebles, East Lothian, West Lothian, Selkirk, Berwick, Fife, Kirkcaldy, and Dunfermline, in view of reports showing the damage caused by decay to children's teeth through sweets and lack of proper dental hygiene. The campaign will involve some 120,000 schoolchildren in the 5 to 11-plus age group. A further 70,000 between 12 and 17 will form a second priority. The programme of dental health education is, however, also to be aimed at parents, grandparents, and others who can influence the children. The campaign will last for over two months, and will call for brushing of the teeth last thing at night, mouth rinsing after snacks, the eating of fruit after meals, and regular visits to the dentist.

ROLE OF INTRATHECAL HYDROCORTISONE IN TUBERCULOUS MENINGITIS IN CHILDREN

BY

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The prognosis of tuberculous meningitis has changed greatly since the introduction of streptomycin and isoniazid. Even so, a large number of patients die of this disease and many of those who survive suffer from various sequelae. The dreaded complications of tuberculous meningitis are produced by deposition of thick fibrinous exudate, resulting in matting together of the leptomeninges, mainly at the base of the brain in the regions of the circle of Willis, the interpeduncular space, the sylvian fissure, and the optic chiasma. When this exudate undergoes fibrous organization it may compress various cranial nerves and the underlying nervous tissue, producing various types of paralysis, vascular occlusion with resultant infarction of the brain, and obstruction to the free flow of C.S.F.

The C.S.F. block may be at different levels: (1) blockage of various ventricular foramina, leading to internal hydrocephalus; (2) spinal subarachnoid block with obstruction near the foramen magnum—intracranial pressure is not necessarily increased though there will be diminished pressure of the spinal subarachnoid fluid; (3) arachnoid block, producing impairment of reabsorption of C.S.F. through arachnoid villi, with marked increase of intracranial pressure.

Various drugs have been used from time to time to prevent formation and organization of the exudate. Smith and Vollum (1950) first tried intrathecal P.P.D.: since then many other workers have used it, but with no good result. Moreover, the treatment is laborious, time-consuming, and hazardous. Streptokinase, streptodornase, heparin, and even trypsin intrathecally have been used by various workers with equally unpromising results. Kinsell (1951) first suggested the use of corticosteroid in the treatment of tuberculous meningitis as an adjuvant to antimicrobial drugs, and many favourable results have been published since then. Corticosteroid, either systemically or better still intrathecally, by its high antiphlogistic, antifibrinous, and antifibroblastic activity prevents or even removes exudate, allowing free flow of C.S.F. to each and every corner of the subarachnoid space, providing better diffusion of antituberculosis drugs, and reducing complications to a minimum.

So far only a few reports (Cocchi, 1956; Lorber, 1960; Godden, 1960) have been published showing the effect of intrathecal hydrocortisone. The idea of the present study is to show the relative efficacy of intrathecal hydrocortisone and to assess its systemic use in the treatment of tuberculous meningitis.

Materials and Method

The study was undertaken in the paediatric department of Calcutta Medical College, where children up to the age of 7 years are admitted. Altogether 43 unselected cases of tuberculous meningitis were studied