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 antifibrotic 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 anti-tuberculosis 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

from July, 1959, to June, 1961. These cases had been proved to be tuberculous beyond reasonable doubt. Reliance was mainly on the following points: (a) Clinical manifestation of irregular fever, vomiting after food, anorexia, irritability, paralysis of varying degree, convulsions, unconsciousness, neck rigidity, positive Kernig's sign, pupillary change, stiffness of the body, increased deep jerks, extensor plantar response, and tense fontanelle where present. (b) C.S.F. findings, such as clear fluid with increased tension, high cell count (mostly lymphocytes), increased protein content, and low sugar and chloride content; tubercle bacilli were found in 47% of the cases. (c) Positive Mantoux reaction in 87% of the cases. (d) Presence of an associated tuberculous lesion in 60% of the cases.

In both the oral and the intrathecal groups the criteria of diagnosis were the same.

Classification of the cases was in accordance with that of the M.R.C. (1948): (1) Mild variety—the patients fully conscious, with only mild focal neurological signs and without any paralysis. They were not included in the study as the prognosis in this group with oral steroid is very satisfactory. (2) Moderate variety—with little disturbance of consciousness and with neurological signs such as paralysis of varying degree. (3) Severe variety—patients in coma with or without convulsions and with gross paralytic manifestations.

The patients fulfilled the following criteria: all of them had active meningitis; they were in the moderate or severe stage of the disease according to the M.R.C. (1948) classification; none had had anti-tuberculosis treatment before admission to hospital; none had previously had corticosteroid in any form; and all had received the same antimicrobial drugs.

Furthermore, the 43 patients under study were divided into two groups—the oral steroid group and the intrathecal steroid group. Alternate patients on admission were given oral or intrathecal steroid, except the last two, who were moribund and were given intrathecal steroid only. The statistical differences were ascribed to difference in treatment, as both the groups were very similar in every other respect.

Of the 43 cases, 20 had oral prednisolone in a daily dose of 10–20 mg. in three or four divided doses for three weeks; it was then gradually tailed off and completely stopped in another week's time. The remaining 23 received intrathecal hydrocortisone 12.5 to 25 mg. daily for six days and then on alternate days for another six injections, thus covering a total period of three weeks. All these patients had the same anti-tuberculosis treatment, such as streptomycin sulphate 40 mg./kg. body weight intramuscularly, and isoniazid 10–15 mg./kg. P.A.S. 250 mg./kg. was given in some cases. None received intrathecal streptomycin.

The C.S.F. was examined several times—once on admission, once after the third intrathecal injection of

steroid, once after three weeks, and finally before discharge from the hospital (see Table I). In none was the C.S.F. cultured for acid-fast bacilli or sent for guinea-pig inoculation test.

Analysis and Discussion

Survival Rate.—There was a marked difference in survival rate in the two groups. In the oral steroid group nine cases were of moderate severity, with 5 (55.5%) survivals, and 11 were severe, with 3 (27%) survivals. In the intrathecal group three cases were of moderate severity and all survived, and 20 were severe with 11 (55%) survivals. Though the survival rate, especially in the oral steroid group, is somewhat lower than that of other workers, it is generally agreed that the survival rate is much lower in the lower age-group of patients (M.R.C., 1948; Cocchi, 1956; Voljavec and Corpe, 1960; Lorber, 1960), and 75% of our patients were under 3 years of age. Besides, most of them were admitted in a very low general condition and poor nutritional state, and their average duration of illness before admission into hospital was from three to four weeks. These additional factors accounted for the higher mortality rate in this series.

C.S.F. Pattern During Course of Treatment.—In the intrathecal steroid group the cell count after the third injection showed a reduction except in one patient who died and in whom the count was raised from 50 to 247 c.mm., and in two cases in which the count was more or less stationary. This low cell count at the second examination proved that repeated injections of hydrocortisone intrathecally did not produce any further septic or aseptic inflammation. After three weeks, when the next full examination was made there was in all cases (both oral and intrathecal groups) a diminution in cell count and protein content, with a rise in sugar and chloride. These changes were definitely more pronounced in the intrathecal group (Table I). The C.S.F. was again examined immediately before the patients were discharged from hospital and in some long-stay cases even earlier. The C.S.F. report was more or less normal within reasonable limits, but the protein content was higher than normal in quite a few cases (Table I). In the intrathecal group the cellular and biochemical cure was quicker than in the oral steroid group, the period of stay in hospital thus being reduced.

Period of Unconsciousness.—The period of unconsciousness was analysed in those who survived and went home with or without sequelae. In the oral steroid group the average duration of unconsciousness was 39.5 days, with a range of 22 to 60 days. In the intrathecal group unconsciousness lasted for 2 to 12 days, with an average of 10 days. One patient, however, remained unconscious for 40 days. He was unconscious for eight days before admission. It was also noticed that the longer the period of unconsciousness prior to admission the longer the delay in regaining consciousness. The

TABLE I.—C.S.F. Pattern During Course of Treatment

	Oral Steroid Group				Intrathecal Steroid Group			
	No. of Cells	Sugar	Chloride	Protein	No. of Cells	Sugar	Chloride	Protein
		(mg. 100 ml.)				(mg. /100 ml.)		
On admission	103 (12-180)	24 (12-38)	626 (580-680)	188 (100-330)	122 (40-320)	28 (12-42)	600 (530-650)	147 (100-380)
After third I.T. inj.					80 (20-150)			
After 3 weeks	40 (24-80)	32 (24-40)	660 (630-700)	154 (100-210)	24 (10-48)	48 (34-55)	686 (638-720)	106 (60-120)
Before discharge	Normal	Normal	Normal	80 (60-110)*	Normal	Normal	Normal	70 (50-80)†

Figures in parentheses indicate the range of measurement. * In six cases. † In five cases.

period of unconsciousness was curtailed greatly in the intrathecal group. Oral feeding in these patients could be resorted to much earlier, with better maintenance of nutrition and quicker recovery. Also the complications of nasal feeding during unconsciousness were minimized and nursing-time was saved.

Period of Stay in Hospital.—Table II shows the period of stay in hospital in the two groups. Only those who survived their period of stay were included in the analysis. The stay was much less in the intrathecal group.

Sequelae.—Before the introduction of steroids in the treatment of tuberculous meningitis a large number of patients suffered from sequelae, particularly in the severe group. Now with the use of steroids, especially intrathecally, the sequelae have been greatly reduced. Table III shows the relative incidence of sequelae in the two groups of patients. In the intrathecal group there were no sequelae in patients with moderate severity, whereas 2 out of 11 severe cases had sequelae—one with

TABLE II.—*Period of Stay in Hospital*

Group	Mean	Range
Oral	3 months 21 days	1 month 25 days to 7 months 25 days
Intrathecal	2 " 3 "	1 " 2 " " 3 " 26 "

TABLE III.—*Incidence of Sequelae*

	Oral Steroid Group			Intrathecal Steroid Group		
	Total No.	No. Survived	No. with Sequelae	Total No.	No. Survived	No. with Sequelae
Moderate	9	5	2 (40%)	3	3	0
Severe	11	3	2 (66%)	20	11	2 (18%)

paralysis of all four limbs and the other with marked dimness of vision. The latter at one time could not see anything, but she gradually recovered some sight before her discharge after a month and 25 days. In the oral steroid group the percentage of sequelae was much higher. In the moderate variety two (40%) out of five patients that survived had sequelae—one had hemiplegia and one had paralysis of the right lower limb. In the severe variety 2 (66%) out of the 3 patients who survived had sequelae—one with hemiplegia and the other with monoplegia. Unfortunately the patients under study could not be kept long in the ward owing to severe overcrowding, nor could they be followed up for any length of time as their attendance in the out-patient department was very irregular.

Summary

Forty-three severe and moderately severe cases of tuberculous meningitis in children were studied in detail and the effects of oral and intrathecal corticosteroid were compared.

In those who received intrathecal hydrocortisone the survival rate was much higher, the disease ran a shorter course, the periods of unconsciousness and stay in the hospital were much less, the sequelae were minimal, and the biochemical cure (in C.S.F.) was earlier.

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LUNG CANCER AMONG WHITE SOUTH AFRICANS

REPORT ON A FURTHER STUDY

BY

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In a previous paper (Dean, 1959) I reported that, while white South Africans had long been the heaviest smokers of packeted cigarettes in the world, British male immigrants to South Africa who died between the ages of 45 and 64 had a mortality rate from lung cancer 44% higher than South-African-born white men of the same age-groups. Moreover, this higher lung cancer mortality among British male immigrants occurred in each of the five major South African cities and in the other urban and rural areas of South Africa. The lung cancer rate of British male immigrants also exceeded the lung cancer rate of male immigrants from other countries. Further, in Durban the lung-cancer rate was high for both South-African-born men and for British immigrants.

On the basis of the national average levels of cigarette consumption, the higher lung cancer mortality rate of the British immigrants was clearly not to be attributed to greater consumption of cigarettes. Nevertheless, it was possible that these immigrants were a special group of heavy-smoking men; therefore a further inquiry was carried out to ascertain, so far as was possible, the smoking habits of both the British immigrants and the men of South African birth who died of lung cancer and those of a matched control group.

Outline of Inquiry

In the previous inquiry the basic statistical information had been obtained from the death certificates of all the men and women who had died from lung cancer between 1947 and 1956, supplied by the Population Registrar in Pretoria. Since the previous study, lung cancer statistics have become available for 1957, 1958, and 1959. During these years the British immigrants continued to have a much higher lung cancer rate than the South-African-born and other immigrants. For the second part of the inquiry a "control" was required for each man who died from lung cancer during the years 1947–56 so that their smoking habits could be compared. The procedure adopted to obtain the controls was to select the first male in the Register of Deaths, following each male lung cancer death, who had died in the same