methotrexate, for the former does not rely entirely on renal or hepatic function for excretion or detoxification.

It is of interest that the diazo-amino acids D.O.N. and azaserine (*o*-diazo-acetyl-L-serine), which were discovered during the search for anti-tumour antibiotics, were found to inhibit growth and induce abnormalities in embryonic development, producing characteristic syndromes of abnormalities in the developing chick embryo when injected into the yolk sac (Dagg *et al.*, 1956). It was further observed that resorption of fetuses of pregnant rats occurred if azaserine was administered (Murphy and Karnofsky, 1956). Interference with embryonic development appears to be a general property of the diazo-amino acids, and it is disappointing that the use of these substances in the treatment of chorioncarcinoma has not been as promising as that of methotrexate.

While it is reasonable to expect response from chemotherapy in the treatment of scattered small metastases, blood-borne agents are less likely to produce an effect against large tumour masses. This appears to be borne out by published cases, where, after hysterectomy and bilateral salpingo-oophorectomy, satisfactory results have followed the use of cytotoxic drugs in the treatment of small isolated or multiple secondary deposits. It must also be remembered that deep x-ray therapy is also extremely effective in the treatment of metastases, and this fact must be borne in mind in attempting to assess the results of treatment by chemotherapy, especially in a disease such as chorioncarcinoma, which may run a variable course, with or without treatment. In advanced cases chemotherapy should form part of an integrated scheme of treatment in conjunction with surgery and deep x-ray therapy, as in the case detailed above.

Summary

A case of widespread chorioncarcinoma is described. The diagnosis was made subsequent to a premature delivery, although its onset may have been as early as the middle trimester of pregnancy. Surgical treatment was followed by chemotherapy and deep x-ray therapy, the patient continuing under out-patient surveillance.

I thank Lady Burt for referring the patient, and the staff of all involved departments at King's College Hospital for their interest and continuing assistance in the management of the patient.

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FURTHER OBSERVATIONS ON THE PERSISTENCE OF ANTIBODY IN ADOLESCENTS AFTER A THIRD DOSE OF KILLED POLIOMYELITIS VACCINE

BY

E. J. C. KENDALL, M.B., M.R.C.P.

Medical Officer, Epsom College, Epsom, Surrey

ANN MILLER, B.Sc.

AND

J. O'H. TOBIN, B.M., B.Ch., Dip.Bact.

Biological Standards Control Laboratory, Medical Research Council Laboratories, London

In a recent publication (Kendall *et al.*, 1960) it was shown that 18 to 24 months after a third, booster, dose of poliomyelitis vaccine the antibody titre had declined to about a fifth of the immediate post-inoculation level. It was pointed out, however, that the results obtained gave no indication of the rate of subsequent antibody decline. The observations presented here may help in clarifying this point.

Methods

Thirty public-school boys, aged 15 to 18 years, who were initially "triple negative," took part in the study. They had been given two doses of British poliomyelitis vaccine four weeks apart, followed by a third dose 6 to 12 months later, and all had vaccine-induced antibody to each poliovirus type when bled 18 to 24 months after this third dose. More blood was obtained nine months later, and the two serum samples taken 18 to 24 months and 27 to 33 months after the third dose were titrated in parallel for poliomyelitis-neutralizing antibody by the galactose colour test, using four tubes per threefold serum dilution and 30–100 TCID₅₀ of the three types of poliovirus. The virus strains used were Brunenders (type 1), MEF-1 (type 2), and Saukett (type 3). Seven subjects from the same group of public-school boys, who had no antibody when bled at 18 to 24 months and were given a fourth dose of vaccine at that time, were also bled again and their serum was tested.

Results

A comparison between the antibody levels obtained in each of the 30 subjects is given in Figs. 1 to 3. The fall in the geometric mean titres between 18 to 24 and 27 to 33 months after the third dose was 22% for type 1, 23% for type 2, and 15% for type 3. Only one boy had no detectable type 1 antibody at the time of this bleed, and his titres were excluded from the figure for this type. The difference in titre for each of the seven boys given a fourth dose is noted in the accompanying Table, and in their case the fall in mean titre was 72% for type 1, 41% for type 2, and 40% for type 3.

Discussion

The decline in poliomyelitis antibody titre found between 18 to 24 and 27 to 33 months after a third, booster, dose of vaccine was slower than that found during the first 18 to 24 months. The rate of decline had dropped from 50% per year to under 30%. This finding agrees with those of Salk (1958) and Brown (1960), who found that there was a decrease in the rate of antibody decline in children after the first one or two years of receiving a third dose.

Poliomyelitis Antibody Titres after a Fourth Dose of Vaccine in Subjects who had Lost Vaccine-induced Type 1 Antibody

Subject	Antibody Titre					
	Type 1		Type 2		Type 3	
	A	B	A	B	A	B
K	20	3.8	308	234	923	234
M	78	2.9	1,215	405	3,645	1,822
S	59	15	535	405	1,215	1,215
A	535	405	3,645	702	2,733	1,215
G	5	<2.2	1,215	702	923	405
L	78	78	535	535	308	308
T	178	34	702	702	308	178

A=Serum sample 14 days after fourth dose. B=Serum sample nine months after fourth dose.

FIG. 1.—Decline of type 1 antibody after a third dose of poliomyelitis vaccine.

FIG. 2.—Decline of type 2 antibody after a third dose of poliomyelitis vaccine.

FIG. 3.—Decline of type 3 antibody after a third dose of poliomyelitis vaccine.

This decrease in fall-off did not seem to depend on antibody level, which was related to the size of the response to the third dose. The levels maintained for type 1 were more variable than those for types 2 and 3, which in turn reflected the poorer type 1 response to the initial injections. Those who had antibody in their serum at the time of the booster dose had titres comparable to those found with types 2 and 3, while the others were much lower. The seven boys given a fourth dose of vaccine were in this latter category. The type 1 antibody level maintained after a fourth dose in at least three of these seven was not encouraging. This again stressed the importance of vaccines adequate in potency to maintain detectable antibody levels between doses. The poorer response to type 1 was due to deficiency in the vaccine and not in the subjects vaccinated, as these showed good responses to the type 2 and 3 antigens.

One can conclude from these and previous results that with a more potent type 1 component the responses to all types would be similar and would enable booster doses of killed poliomyelitis vaccine to be given concurrently with other prophylactics, and with as much success, without any need for intermediate injections (Kendall *et al.*, 1960).

Summary

The rate of decline in poliomyelitis antibody in 30 adolescents after a third dose of poliomyelitis vaccine was reduced during a nine-month period following the first 18 to 24 months after injection. Good antibody levels which persist can thus be obtained after killed poliomyelitis vaccine if the material used is of adequate potency.

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The annual report for 1959 of the South-western Regional Cancer Records Bureau (of which Mr. Reginald M. Vick is the director) contains a commentary by Mr. G. M. FitzGibbon, of the department of plastic and jaw surgery, Frenchay Hospital, Bristol, entitled "Surgery and/or Radiation?" The purpose of his commentary is to pose the question: "Are our present methods of treatment the best we can offer the patients?" After briefly reviewing the treatment of malignant growths of the mouth and tongue by radiation and surgery, Mr. FitzGibbon asks: "Is it justifiable to treat so many advanced cases which have little or no chance of doing any good, or of even being alleviated? By undertaking this great volume of fruitless and unavailing work are radiotherapy departments decreasing the efficiency of their treatment in any way for the better and more hopeful cases? Would these less advanced cases do better if there were more time available to consider, plan, and treat them and follow them up? The question of selection for treatment in radiotherapy departments must present enormous problems, both technical and human, unless one just treats everything sent along, in which case, of course, there is no problem." He concludes that there is a lot to be said for a more detailed review of methods of treatment, and possibly that a return to and greater emphasis on efficient and early surgery, supplemented where necessary by radiotherapy, may bring better results than those being obtained at the present time.