TABLE I.—Analysis of Results by Age and Sex

Age Groups (Years and Months)	Boys							Girls							Totals for Both Sexes							22
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
	No. with No Defects by Retinoscopy	No. with Uncorrected Defects by Retinoscopy	No. Confirmed by Specialist asHavingUncorrected Defects	No. with Refractions Corrected at Time of Survey	Total with Defects (Columns 3 + 4)	Total with No Defects	Total No. Examined	No. with No Defects by Retinoscopy	No. with Uncorrected Defects by Retinoscopy	No. Confirmed by Specialist asHavingUncorrected Defects	No. with Refractions Corrected at Time of Survey	Total with Defects (Columns 10 + 11)	Total with No Defects	Total No. Examined	Total with No Defects by Retinoscopy	Total with Uncorrected Defects by Retinoscopy	Total Confirmed by Specialist asHavingUncorrected Defects	Total with Refractions Corrected at Time of Survey	Total with Defects (Columns 17 + 18)	Total with No Defects	Total Examined	
18 m.-2-0	18	1	1	0	1	18	19	7	1	1	0	1	7	8	25	2	2	0	2	25	27	7-4
2-1-2-6	19	0	0	1	1	19	20	12	1	1	0	1	12	13	31	1	1	2	31	33	6-0	
2-7-3-0	12	1	1	0	1	12	13	10	2	2	0	2	10	12	22	3	3	0	22	25	12-0	
3-1-3-6	23	1	1	0	1	23	24	37	2	2	1	2	37	40	60	3	3	4	60	64	6-25	
3-7-4-0	31	1	1	0	2	31	33	33	3	1	2	3	35	38	64	4	2	3	66	71	7-0	
4-1-4-6	28	5	4	2	6	29	35	43	2	4	2	6	44	50	101	10	8	12	103	115	10-0	
4-7-5-0	64	8	6	1	7	66	73	49	2	2	1	3	49	52	113	10	8	10	113	125	8-0	
Totals	225	17	14	5	19	228	247	191	16	13	6	19	194	213	416	33	27	11	38	422	460	8-26

visual defects were discovered—i.e., 7.7% and 8.9% respectively, with an overall percentage of 8.26. The number of children who were already receiving treatment for defective vision at the time of the investigation was 11 (five boys and six girls), or 2.39%. A further 33 cases were revealed by the survey; of these, 27 were later confirmed—i.e., 5.87%.

Table II provides an analysis of the defects found.

TABLE II.—Analysis of Defects

Conditions	No. of Uncorrected Cases	No. of Corrected Cases
Compound hypermetropic astigmatism	13	4
Convergent strabismus; compound hypermetropic astigmatism	4	7
Low hypermetropia	5	0
Myopia	2	0
Mixed astigmatism	2	0
Simple hypermetropia	1	0
No significant error	6	0
Totals	33	11

Conclusion

The results of this investigation are to be regarded as a "pilot" survey. Children attending nurseries may not be representative of the whole child population in the age groups examined. Further, a retinoscopy examination without the use of a mydriatic cannot give entirely accurate information about the state of the ocular mechanism. The method employed was devised and used as a simple and speedy technique to discover grosser errors of refraction. Despite its limitations it is contended that the method is justified and suitable for use on a wide scale in the annual examination of children of pre-school age.

Dr. Leonard Scheele, Surgeon-General of the U.S. Public Health Service, is reported to have stated recently that 1949 will be the worst year for infantile paralysis in the history of the United States, with cases reaching a total of 40,000 to 45,000. This will be a 50% increase over the infantile paralysis cases reported last year, and he feared that figures may be even higher next year and in the years to come. In the 10 years before 1943 there was only a moderate incidence of infantile paralysis in the U.S.A., but since then there has been a marked upward trend.

ACUTE ADRENAL INSUFFICIENCY AFTER ADRENALECTOMY FOR PRE-PUBERTAL VIRILISM

BY

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The following case is reported because it must represent closely the results of total extirpation of the adrenals in man.

Case Report

A girl aged 6 was found to be suffering from typical pre-pubertal virilism when first seen on November 8, 1944. The urinary 17-ketosteroid excretion was 12.3 mg. a day. Laparotomy was performed; this confirmed her sex and showed both adrenals to be much enlarged. Left adrenalectomy was carried out and the ketosteroids fell to 8.3 mg. a day. Her physical condition, however, did not improve, and her psychological condition became so difficult that her parents found it impossible to manage her. She was therefore readmitted at the age of 9½ for further treatment.

Although her general appearance was that of a normal girl of this age there was marked enlargement of the clitoris, and the vagina was rudimentary. A heavy growth of pubic hair was present. Her mental ability was only that of a child two years younger, and she behaved in an excessively rowdy way. Her voice was unusually deep. The urinary 17-ketosteroids were now 26 mg. a day.

The right adrenal gland was explored on February 20, 1948, and found to be about five times the normal size. A portion 1½ by 1 in. (3.75 by 2.5 cm.), representing just under half the gland, was resected with the diathermy needle and the cut edge of the remainder of the gland oversewn with catgut. The wound was closed without drainage. A small wound was accidentally made in the pleura; it was immediately closed. An intravenous glucose-saline drip was started.

Ten hours after operation her condition was quite satisfactory and the intravenous drip was discontinued. But the pulse and respiration rates began to rise during that night, and by 24 hours after operation the blood pressure had fallen to 75/45, her pulse was weak and rapid, and she was drowsy but rational. She was sweating slightly and her skin felt warm. It was now noticed that generalized pigmentation of the skin was developing. As the day went on she became noisy and restless, and her temperature rose to 103° F. (39.4° C.). A right-sided

pneumothorax was present. Two 10-ml. doses of "eucortone" were given during this day, but had little noticeable effect. During the night her condition became steadily worse. The blood pressure remained at 75/45, and her pulse became irregular and at times uncountable at a rate of about 180 a minute. The respiration rate rose to 60 a minute. She was delirious and incontinent of urine.

On the morning of the second day after operation her condition was so grave that the ward sister thought she was not likely to live for more than an hour. The pulse was uncountable and the respiration rate still 60; the blood pressure was now only 50/20. A deep generalized pigmentation of the skin was present; it was of café-au-lait colour and evenly distributed over the whole body. Nevertheless, her ears and lips remained a good pink colour and the pale grey-blue cyanosis seen in cases of severe shock—e.g., after severe burns—did not develop. The haemoglobin was 55%, so it was evident that the haemoconcentration of shock was not developing.

She was given 10 ml. of eucortone intravenously, and one hour later her general condition was noticeably better. A further 15 ml. was therefore given immediately, and further improvement followed. An intravenous glucose-saline drip was started again and eucortone, 30-ml., was introduced with it four-hourly. During the day she vomited several times, but the total amount brought up in the post-operative period could not have been more than 1 pint (568 ml.). She passed no urine, and by the evening oedema of the face, particularly about the eyelids, was beginning to develop. She was catheterized, but only about

Chart showing blood pressure and the course of adrenal cortex replacement treatment.

50 ml. of urine was obtained. This was of average concentration and contained albumin but no sugar or ketone bodies. The urinary chlorides were 3 g. per 100 ml., and a blood sample taken at the same time contained only 292 mg. of sodium per 100 ml. (normal 325 mg.).

Her condition continued to improve during the night, though she was noisy and delirious and required heavy sedation. By the next day, the third after the operation, the blood pressure was rising and the pulse and respiration rates were falling. There was marked oedema of the face but none of the limbs or sacral area. She began to take fluids by mouth and passed 30 oz. (950 ml.) of urine. On the fourth day she was rational and sleepy, and her general condition had very much improved. She was taking food by mouth, and the blood pressure had risen to 102/75. The oedema was subsiding, but the pigmentation still remained.

From then onwards she made rapid progress. The eucortone was reduced to 10 ml. four-hourly on the third day after operation, and she was given 20 ml. on the fourth; it was stopped altogether on the fifth day, and desoxycortone acetate, 2 ml. (10 mg.) was given thrice daily for five days followed by 2 ml. daily for two days. Common salt, 6 g. daily, was given while she received desoxycortone acetate. The oedema had disappeared by the sixth day. The pigmentation gradually faded; it had become faint by the eighth day and had disappeared by the sixteenth, by which time she was afebrile and in excellent health. The total amount of eucortone given was 275 ml. The urinary ketosteroids on March 16 were 8.4 mg. a day.

Discussion

It will be seen that, three years after one adrenal had been removed, resection of about half of the remaining gland was followed by a crisis similar to those which occur in Addison's disease. It did not occur immediately after the operation, but began within 12 hours of it. It is presumed to have been due to defunctioning of the remaining part of the gland by oedema, with the added possibility of thrombosis of the adrenal vein by the diathermy used in the excision.

Pigmentation occurred within 24 hours of the operation and was maximal within 48 hours of it; it was generalized and even, and in colour and depth closely resembled that of known cases of Addison's disease which were in the ward at the time. It had almost disappeared eight days after the operation. This was the most striking feature of the crisis.

The pigmentation of Addison's disease has been accounted for as follows. Adrenaline is normally prepared in the adrenal medulla from tyrosine, which is stored in the skin. If the adrenal medulla is destroyed and no adrenaline is formed the tyrosine is not used up and accumulates in the skin, where a tyrosinase converts it into melanin (Wright, 1945). The fact that pigmentation occurred so rapidly in this case seems to support the theory that adrenaline is secreted continuously in man.

The patient's condition during the crisis was rather like that in surgical shock, but the extremities remained warm and pink instead of cyanosed, and there was marked hyperventilation. The whole clinical picture resembled the Waterhouse-Friderichsen syndrome closely, but no petechiae were present, livid cyanosis did not occur, and she responded well to treatment with adrenal cortex extract (Martland, 1944). The pigmentation seen in this case has not been described in either of the above-mentioned conditions.

Summary

A case of pre-pubertal virilism is described; it was treated by adrenalectomy, followed later by removal of part of the remaining adrenal gland.

A crisis resembling those of Addison's disease occurred during the first few days after the second operation; it responded well to treatment with eucortone, desoxycortone acetate, and intravenous glucose-saline. Recovery followed.

I wish to thank Mr. L. R. Broster for permission to publish this case and for his help in preparing the paper.

REFERENCES

- Martland, H. S. (1944). *Arch. Path.*, **37**, 147.
Wright, S. (1945). *Applied Physiology*, 8th ed. London.

In future national insurance cards will not be stamped by patients in mental institutions or by the staff of the institutions on the patients' behalf. The Ministry of National Insurance will not ordinarily examine liability for contributions until after a patient's release, unless the next of kin wishes to pay or an application for benefit is made. These arrangements have been agreed by the Ministries of Health and National Insurance, and are conveyed to mental institutions in Circular 95/49. The insurance cards should be returned to the local national insurance office, which will issue to the institution a form for each patient instead of a card. If the patient is transferred to another institution the form should accompany the patient, and on the patient's discharge or death it should be returned to the local office named on the form. The next of kin of the patient or the person to whom correspondence about the patient is sent will have an opportunity of paying national insurance contributions on the patient's behalf if he wishes to do so.