Although nearly all the patients found the formula diet to be palatable, they succumbed, sooner rather than later, to the temptation to eat substantial amounts of prohibited natural foodstuffs; when they did so, effective weight loss ceased more or less. Nevertheless, those who persisted with the formula diet alone or supplemented by permitted low-calorie foods only, lost weight at the expected rate of 2 to 3 lb. (0.9 to 1.4 kg.) each week.

The results of this study may justifiably be compared with those of previous trials in which the same or similar patients, all having refractory obesity, were treated with anorectic agents. After taking the formula diet for eight weeks the 37 patients studied had lost an average of 11.1 lb. (5 kg.) in weight; in contrast the mean weight loss was only 3.1 lb. (1.5 kg.) for 40 patients treated with diethylpropion (Seaton *et al.*, 1961) and 4.2 lb. (1.9 kg.) for 85 persons given phenmetrazine (Duncan *et al.*, 1960) over the same period of time.

The use of powdered "formula diets" has been condemned on several grounds. The criticisms that it may cause major psychological disturbances or, when taken for long periods of time, nutritional deficiencies are scarcely justified (Antos, 1959; Roberts, 1960; Tullis *et al.*, 1960). Nevertheless, a formula diet does not help to establish proper dietary discipline and habits, and this study has confirmed the view that the majority of patients again put on excessive weight on resuming a natural though supposedly restricted diet (Table I).

Formula diets would seem to have a limited place in the treatment of obese persons for whom conventional subcaloric diets have been ineffective. As loss of weight was greatest in the first few weeks only, short-term therapy may be justified though repeated courses may be necessary. Low-calorie foodstuffs do not materially influence the rate of weight loss and can be allowed in restricted amounts as they make the diet more acceptable.

Summary

A twelve-weeks trial of a formula diet in the treatment of 46 women having "refractory obesity" is reported.

Of the 37 patients who completed the study, 32 lost weight. The mean loss was much greater than that achieved by anorectic agents in similar patients.

Nine patients failed to complete the trial period and 33 of the remaining 37 admitted taking prohibited natural foods before the end of eight weeks.

Low-calorie foods make the diet more acceptable, do not greatly influence weight loss, and should be allowed in restricted amounts.

One year after completion of the trial most patients had regained their original weight while on conventional subcaloric diets.

Our results suggest that a formula diet should generally be given for periods of a few weeks only and repeated as required.

We are grateful to Sir Derrick Dunlop for his encouragement and advice and to the patients who so willingly co-operated in this study. Our thanks are also due to Mrs. R. McMillan for considerable secretarial assistance. The formula diet used in this trial, "metercal," was supplied through Dr. A. O. Zink, of Mead Johnson Limited.

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AN XX HERMAPHRODITE WITH MALE SOCIAL SEX

BY

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The chromosome complement in several hermaphrodites is now known. A simple XX sex chromosome arrangement was reported by Hungerford, Donelley, Nowell, and Beck (1959); Harnden and Armstrong (1959); de Assis, Epps, and Bottura (1960); Sasaki and Makino (1960); and Gordon, O'Gorman, Dewhurst, and Blank (1960). Ferguson-Smith, Johnston, and Weinberg (1960) reported two further cases with a probable XX complement although, in each, additional chromosome material was found in some of the cells examined. Sandberg, Koepf, Crosswhite, and Hauschka (1960) reported briefly one case whose karyotype was XY. XY/XO mosaics in whom there is some histological support for the diagnosis of hermaphroditism have been described by Hirschorn, Decker, and Cooper (1960) and Miller (1961). A further mosaic not yet fully elucidated has been described by Waxman, Kelley, Gartler, and Burt (1962).

More information is known about the nuclear chromatin state in hermaphrodites since Grumbach and Barr (1958) reported on a group of 25 such patients, 19 of whom were

chromatin-positive and six chromatin-negative; it is not, however, known if these patients had a simple XX and XY sex chromosome complement respectively. In order that a more complete picture may be obtained of the chromosome complement in these cases we believe it to be important to report others in whom full investigation has been possible. We describe here a further case of a hermaphrodite with an XX sex chromosome complement.

Case Record

A 40-year-old married man presented himself for treatment of a right inguinal hernia on March 16, 1962. In October, 1961, he had been found to be diabetic and was receiving 36 units of insulin zinc suspension daily. At the time of the investigation into his diabetes he was recognized as having a genital deformity about which he was so sensitive that he failed to keep a further appointment at which it was hoped to investigate this aspect of his case. For this reason he was not questioned further about his marital relationship at the time of admission for the hernia operation. Neither he nor his wife volunteered any further information about the matter, and it

was not thought to be in his interest to worry him further. There seemed no reason to doubt that he was reasonably well orientated to the male sex, albeit embarrassed about his sexual abnormality. It was decided to examine his genitalia very closely under anaesthesia at the time of the herniorrhaphy.

At operation on March 13 a very careful inspection was made. His general bodily configuration was not clearly abnormal, but there was slight breast development, although hardly sufficient to cause embarrassment. Pubic hair was of female type. The "penis" was moderately enlarged but was below the size of that of a normal man. The glans showed a terminal dimple but no orifice (Fig. 1), while on the perineum, some distance away from the base of the phallus, there appeared to be a small opening; on closer examination this proved to be two separate openings. A catheter introduced

FIG. 1.—View of the genitalia, showing a moderately enlarged penis with the perineal opening below it. The right inguinal hernia can be seen and an impression gained of the two masses it contained.

into the anterior one entered the bladder, and cystoscopy and urethroscopy showed the characteristics of a female bladder and posterior urethra, no verumontanum being visible. The posterior opening led to a narrow canal, almost certainly the vagina, although no cervix could be seen at this upper end; the canal was too narrow to admit a finger. No definite scrotum was present on either side, but the skin was thickened and rugose. There was a right inguinal hernia, of which the lower pole entered the upper part of the right "scrotal" tissue; this hernia clearly contained two solid masses, a smaller below and a larger above, and it was thought that these might be an undescended testis and a uterus. No gonad could be felt in the left inguinal region.

The hernial sac was explored and opened. Within it the first recognizable structures were a rudimentary uterus and one Fallopian tube. The small swelling appeared to be a gonad, which felt fibrous and abnormal and could not clearly be defined as ovary or testis. Since in any event it seemed unlikely that the gonad was functioning normally, and since it could not easily be preserved without damage to its blood supply, the whole contents of the hernia were removed, and the repair was carried out with a nylon yarn.

The abdomen was then opened and the pelvis inspected. No other genital organs could be found. The appendix was removed. He made a good recovery from this operation.

Sex Chromatin and Chromosome Analysis

The buccal mucosa smear was sex-chromatin-positive and indistinguishable from that of a normal female. Sixty cells, each with a single sex-chromatin body, were observed in the 100 cells examined. Cells containing two or more sex-chromatin bodies were not apparent.

Two separate blood samples were cultured by a modification of the method of Moorhead *et al.* (1960) and a skin biopsy was cultured by a modification of the method described by Harnden (1960). The chromosome counts are summarized in the Table. Of the 101 cells counted, 92 contained 46 chromosomes. Detailed analysis of 12 of these cells showed a chromosome make-up indistinguishable from that of a normal female. The missing chromosomes from the hypodiploid cells were variable and the hyperdiploid cells clearly contained broken chromosomes.

Chromosome Counts

Tissue		Counts					
		<46		46		>46	
		Counted	Analysed	Counted	Analysed	Counted	Analysed
Peri- pheral blood	No. 1	1	1	28	4	2	2
	No. 2	2	2	30	4	0	—
Skin	..	3	3	34	4	3	3

The chromosome constitution of the patient, as deduced from these preparations, is then indistinguishable from that of a normal female.

Pathological Report

The excised specimen measured about 2 in. (5 cm.) in diameter. It consisted of two main masses. The larger, about 1½ in. (3 cm.) in diameter, was roughly spherical in shape. It showed two small excrescences or cornua; to one of these was attached what appeared to be a Fallopian tube some 1½ in. (3 cm.) in length, and to the other a fibrovascular ligament. Section of the mass showed several tiny cystic spaces but no actual canal. The smaller mass was oval in shape. It measured ½ by ½ in. (1.9 by 1.3 cm.). On cut section about half the specimen showed a typical testicular structure. The remainder was fibrous and evidently ovarian.

Microscopical examination of the larger mass showed typical uterine fibromuscular stroma in which were embedded several proliferative endometrial glands. The presence of a Fallopian tube was confirmed from the appearance of its typical lining. No cervical tissue was identified. Microscopical examination of the small mass confirmed that about half of it was made up of simple testicular tubules with a juvenile epithelium and prominent interstitial cells (Fig. 2). This typical cryptorchid testis was separated by a zone of fibrous tissue from an area of ovarian stroma showing in it several corpora albicantes (Fig. 3). Vas deferens and epididymis were not found.

The specimen therefore comprised an ovotestis showing evidence of past ovulation, a Fallopian tube, and a distorted uterus in which were proliferative endometrial glands.

Discussion

We do not propose to discuss in any detail the management of hermaphroditism. This patient was 40 years old and a married man who wanted treatment for his hernia.

FIG. 2.—Section of the testicular part of the gonad showing testicular tubules with much fibrosis, and prominent interstitial cells. (×75.)

It is clear that he had nothing to gain, and perhaps much to lose, by our paying more than passing attention to this aspect of his case. So far as is known, he was fairly well adjusted to the male sex, but that is not to say that he may not have suffered acutely throughout his life by possessing such a deformity. A genital abnormality of this nature

Fig. 3.—Section of the ovarian part of the gland showing an old corpus albicans. ($\times 75$.)

should nowadays call for full investigation within the first year of life; once such investigation is complete, a decision may be made concerning the sex in which it is better to bring the patient up and appropriate plastic surgical procedures can be planned (Wilkins, 1960; Gordon and Dewhurst, 1962).

Summary

The case is described of a 40-year-old hermaphrodite whose social sex was male. The external genitalia showed a moderate-sized penis, a perineal urethra, and a rudimentary vagina; within the sac of a right inguinal hernia were a single ovotestis, a uterus, and a Fallopian tube. Chromosome analysis showed him to have 46 chromosomes with an XX arrangement of sex chromosomes.

We wish to record our grateful thanks to Mr. Francis Masina, under whose care the patient was admitted and who performed the operation, for permission to study and to report this case.

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Medical Memoranda

Heal Prolapse Through Ruptured Vagina : Complication of Manchester Operation

The following case is thought to be rare enough to warrant recording.

CASE REPORT

The patient, a para-8 aged 79, was first operated on in September, 1958, for a procidentia. The standard Manchester operation (anterior colporrhaphy with amputation of the cervix and precervical suture of the cardinal ligaments and posterior colpoperineorrhaphy) was performed. The pouch of Douglas was not opened during the operation. Post-operative progress was satisfactory, and at follow-up six weeks later the vaginal walls and cervical stump were well healed and supported.

She remained well subsequently until the afternoon of January 6, 1960, when, while waiting in a queue, she suddenly developed a severe pain accompanied by a sensation of "something coming down" and slight bleeding per vaginam. There was no history of recent strain or trauma. After a while the pain eased, and she was taken home by car. During that night, however, she experienced gradually worsening colicky lower-abdominal pain, and on getting out of bed the next morning noticed that something was protruding from her vulva. During the ensuing day the pain continued to increase in severity, and she vomited three times prior to sending for her practitioner, who arranged her immediate transfer to hospital.

On admission at 6 p.m. on January 7, more than 24 hours after the original incident, she was restless and slightly shocked. Abdominal examination showed slight distension with obstructive bowel sounds. Vaginal examination revealed an 18–24 in. (45–60 cm.) loop of gangrenous small intestine protruding through a clean-edged transverse tear about 1 in. (2.5 cm.) long in the posterior fornix, just behind the cervical stump. The vaginal epithelium and the cervical stump were healthy

apart from the tear, and there was no recurrent prolapse. An intravenous glucose-saline drip was started, a Ryle tube was passed, and the gastric contents were aspirated. It was decided to perform an immediate laparotomy under general anaesthesia.

At operation a loop of proximal ileum was seen to be disappearing through a transverse tear $1\frac{1}{2}$ in. (3.8 cm.) long in the floor of the pouch of Douglas. The pelvic organs were otherwise normal in every way for a woman of her age. The afferent and efferent loops of the strangulated ileum were divided between intestinal clamps through healthy tissue close to the point of disappearance through the vaginal vault, and the intervening mesentery was ligated and divided. End-to-end anastomosis was then performed and the freed loop of gangrenous gut removed per vaginam, after closing the ends with continuous sutures to prevent spill of its contents. The laceration through the peritoneum of the floor of the pouch of Douglas into the posterior vaginal fornix (to which it was firmly adherent at this point) was sutured from above in one layer and reinforced by oversewing the Fallopian tubes.

Post-operatively a severe paralytic ileus developed and the "drip" and gastric aspirations had to be continued for seven days. Penicillin and streptomycin were given intramuscularly. The patient responded to this treatment and appeared to be progressing satisfactorily when, on the 14th day after operation, she suddenly collapsed and died before medical aid could be summoned. Post-mortem examination was not allowed by the relatives.

COMMENT

Spontaneous rupture of the vagina with extrusion of bowel appears to be a rare late complication of vaginal surgery, and an extensive review of the literature of the past 40 years discloses only one such case following colporrhaphy (Thompson, 1948). His patient was aged 61, the accident occurring eight years after the operation. He did not state whether the full Manchester repair had been performed, or simply anterior and posterior colporrhaphy. Thomson's case differed from the one described here in that the large bowel (pelvic colon) was involved