THE EXCRETION OF URINARY NEUTRAL
17-KETOSTEROIDS FOLLOWING BILATERAL
SPLANCHNICECTOMY AND RIGHT ADRENAL-
ECTOMY

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The aim of the present study has been to discover whether the total urinary excretion
of neutral 17-ketosteroids is affected by division of the nerves supplying the adrenal
glands, with or without complete removal of one adrenal gland.

During treatment for essential hypertension, selected patients undergo bilateral
splanchnicectomy resulting in complete section of the nerve supply of the adrenal
glands, and in addition right-sided adrenalectomy may be performed. It is thought
that in women the urinary 17-ketosteroids are derived from the adrenals only, and
that the ovaries probably play no part in their production, since ǒophorectomy does
not significantly alter the excretion [Callow, 1938; Callow, Callow & Emmens, 1940;
Fraser, Forbes, Albright, Sulkowitch, Reifenstein, 1941; Ross, Hamblen, Cuyler
& Baptist, 1941; Hamblen, Cuyler & Baptist, 1941]. Further, negligibly small assays
have been reported in women suffering from Addison’s disease [Fraser et al. 1941].

Accordingly two female patients undergoing surgical treatment for essential
hypertension were selected for this investigation.

Low excretions have been reported in some hypertensive patients by Bruger,
Rosenkrantz & Lowenstein [1944] and Selye [1947], but as Talbot & Butler [1942]
and other workers have shown, there is a tendency in chronic illness from any cause
for the 17-ketosteroid excretion to be moderately low.

Forbes, Donaldson, Reifenstein & Albright [1947] found that in relatively healthy
patients various types of acute trauma (e.g. operations, burns, acute infections)
resulted in a definite pattern of 17-ketosteroid excretion. Within 24–48 hr. of operation
there was an increase in excretion to a higher level than normal followed by a rapid
fall to a low level on the fourth or fifth day, with a return to normal levels in 10 days.
The peak which preceded the fall tended to be more marked in men than in women.
When the patients were chronically ill or debilitated the response to trauma was only
slight or absent altogether. Their patients included three men who had had bilateral
lumbodorsal splanchnicectomy performed in two stages for essential hypertension,
and their 17-ketosteroid excretion followed the typical pattern with an eventual
return to pre-operative levels. In view of these findings, the period between the two
operations in our patients for this investigation was greater than 10 days, and
excretion after the second operation was observed for longer than 10 days in order
to be certain that the post-operative phase was over.
It has been shown by Hamblen, Ross, Cuyler, Baptist & Ashley [1939], Wooster [1943], Venning & Kazmin [1946] and Forbes et al. [1947] that there is a marked daily fluctuation in the excretion of 17-ketosteroids by any one individual, so that in order to establish a base line of excretion, daily estimations for at least a week are required.

**EXPERIMENTAL AND RESULTS**

Estimations were carried out on urine from two patients: Miss B. aged 48 years and Miss G. aged 39 years, who were suffering from essential hypertension likely to benefit from surgical treatment. Both had a bilateral splanchnicectomy and in addition Miss B. had a right adrenalectomy. Operations were performed under pentothal and spinal procaine, and during splanchnicectomy the greater splanchnic nerve was divided, the sympathetic chain was removed from T. 8 to L. 3, and all communications to the coeliac ganglion from the spinal nerves were divided just short of the ganglion. Miss G. developed a small effusion at the base of the left lung following the first stage of the operation, but otherwise both patients made uneventful and satisfactory recoveries.

The 17-ketosteroid excretion was determined in duplicate samples from 24 hr. collections of urine, using the method of Robinson [1948].

The observations were planned to give adequate control periods before and after treatment, and the interval between the two operations was greater than 10 days. Details of excretion are shown in the accompanying graph (Fig. 1), which shows clearly that the operative procedures were without significant effect on the excretion of 17-ketosteroids.
CONCLUSIONS

As a result of division of the nerve supply to the adrenal glands with or without removal of one of them, no change in the daily excretion of urinary 17-ketosteroids has been found. It appears that their production is not under nervous control, and that when one adrenal is removed the other can compensate for it adequately.

These patients have not shown the post-operative pattern of excretion reported by Forbes et al. [1947], though neither of them was in a severely debilitated condition. The daily variations could not be correlated with any investigations carried out, or any signs and symptoms.

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REFERENCES