

LOCALIZATION OF A METASTATIC ADRENAL CARCINOMA USING ¹³¹I-19-iodocholesterol

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Radioactive iodocholesterol was administered to a patient with proven adrenal carcinoma, and serial abdominal scans were performed. The scan after 7 days revealed a large area of increased activity in the region of his previous adrenalectomy as well as other smaller areas suggestive of metastases. These findings correlated well with subsequent arteriography.

Iodine-131-19-iodocholesterol, a radioactive compound synthesized by Beierwaltes, et al has been used to visualize normal human adrenal glands (1), glands in patients with excess ACTH (1-3), isolated aldosteronomas (4), and adrenal remnants after "total" adrenalectomy (5). Visualization of malignant adrenal diseases, however, has not been previously reported. We present a patient in whom localization of metastatic adrenal carcinoma was achieved using ¹³¹I-19-iodocholesterol.

CASE REPORT

MP, a 10½-year-old white boy presented with a 1-month history of weight gain, hypertension, and the development of acne and pubic hair. On admission, blood pressure was 220/130 mm and moon facies, acne, and modest pubic hair were seen. No striae were present and the testes measured 0.5 × 0.25 cm. A grand mal seizure occurred and was easily controlled with i.v. diazepam. Hypertensive encephalopathy was diagnosed and treated with i.m. hydralazine. Laboratory data (Table 1) confirmed autonomous adrenal hyperfunction. The rapid progression, combination of virilization with prepubertal testes, and clinical evidence of cortisol excess led to a preoperative diagnosis of adrenal carcinoma. X-ray studies showed a left adrenal mass which at laparotomy was an adrenal carcinoma with invasion of the left renal vein and a para-aortic lymph node (Figs. 1 and 2). All visible tumor was removed along with

the left adrenal and kidney. Maintenance dexamethasone therapy was started postoperatively.

After discharge, blood pressure became normal and acne decreased but weight gain continued. The patient still appeared Cushingoid but steroid excretion was normal (Table 1). Two months later, severe left-sided pains and acne developed. Blood pressure was now 135/95 and pubic hair had increased. He was readmitted and urinary steroids confirmed recurrent Cushing's syndrome. He was hypokalemic ($K^+ = 2.9$ mEq/liter) and blood pressure rose to 130 mm diastolic. After informed parental consent and thyroid blockade with Lugol's iodine, 1 mCi of iodocholesterol was given. A large area of uptake in the region of his previous surgery was seen on the scan 7 days after injection. Other small suspicious areas were noted but were difficult to interpret because of the patient's inability to lie perfectly still during the entire scan (Fig. 3). After this scan, an arteriogram was performed to evaluate operability. The splenic and pancreatic arteries were encased by a large tumor mass and multiple omental metastases were seen on the venous phase so that surgical intervention was not undertaken (Fig. 4). The patient was discharged on o.p'DDD (mitotane) and antihypertensive therapy with temporary relief but died 1 month later after an apparent intra-abdominal catastrophe. Autopsy permission was refused.

DISCUSSION

Iodine-131-19-iodocholesterol scanning has been proven effective in the localization of adrenal tissue. The advantages of precise preoperative localization of disease to one side or both has been stressed pre-

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TABLE 1. URINE AND PLASMA STEROID DETERMINATIONS

Date	Dex* (mg/24 hr)	Creat† (mg/24 hr)	17 KS (mg/24 hr)	17 OH (mg/24 hr)	Plasma cortisol (µg%)	
					(8 am)	(4 pm)
1st admission						
1/16/73		856	12.0	18.4	25	30
1/19/73	6‡	912	12.3	13.1	24	29
1/24/73 surgery						
1/30/73	2	832	5.2	1.4		
2/12/73 home	0.5	882	2.7	0.7		
4/18/73	0.5	850	28.5	27.0		28
2nd admission						
4/24/73	0	1,002	55.4	55.7	35	37
4/28/73	4‡	774	41.4	62.5		

* Dex = dexamethasone.

† Creat = urinary creatinine.

‡ 3rd day dexamethasone suppression.

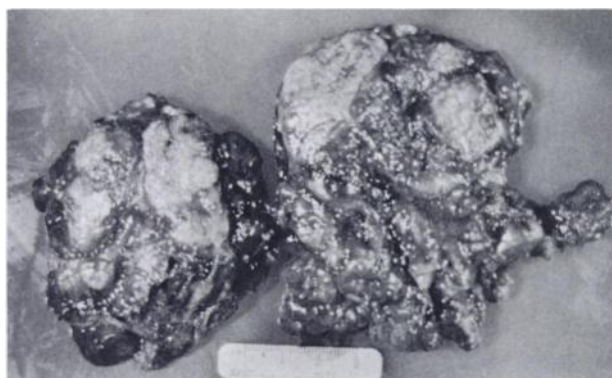


FIG. 1. Bisected surgical specimen showing large adrenal carcinoma with areas of hemorrhage and necrosis.

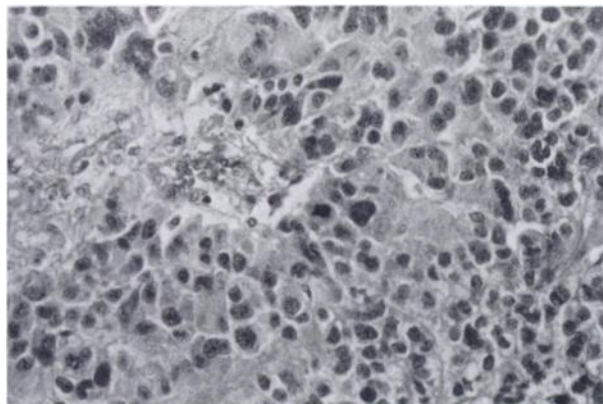


FIG. 2. Histologic section of adrenal carcinoma with mitotic figures, giant cells, pleomorphism, and areas of necrosis.

viously (6-8). Adrenal vein catheterization requires much technical expertise whereas arteriography and venography carry significant morbidity. The use of iodocholesterol scanning is noninvasive, easily performed, and carries minimal risk. To date its use in the localization of adrenal malignancies has not been reported. In the case of this boy with proven adrenal

carcinoma, it was necessary to determine if recurrence was due to a single or to multiple metastases; surgery would be considered in the former and chemotherapy in the latter. Technical difficulties, mostly poor patient cooperation, prevented accurate assessment although it is clear that there was at least one large tumor mass. Although we felt that arteriography would be more quickly diagnostic, it was also of much greater risk in this patient with severe hypertension and only one kidney.

Because the tumor was very actively producing steroids, we initiated scanning 5 days after injection. This scan, however, was poor because of high gastrointestinal radioactivity. The scan at 7 days showed better contrast between tumor and surrounding tissue. The scan after 9 days was poor because of the extreme pain the patient experienced lying prone and the low information density of the counts.

We recommend early bowel cleansing before early

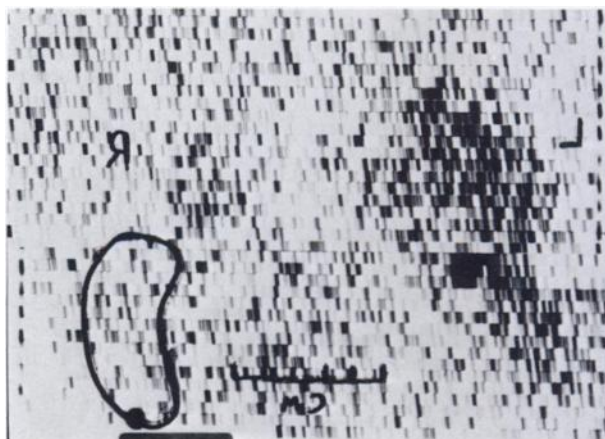


FIG. 3. Posterior abdominal scan on Day 7 performed with Picker Magnascanner 5-in. Rectilinear Scanner with broad 5-in. collimator. Scan has been reversed to allow comparison with arteriogram. Position of right kidney is superimposed from earlier renal scan using ^{99m}Tc-DPTA.



FIG. 4. Venous phase of aortic arteriogram showing large tumor mass and multiple omental metastases.

scans are performed and adequate sedation to permit proper positioning of the patient during the lengthy period of scanning. The disappearance of blood radioactivity and its clearance by the kidney was similar to previously reported data (1,3,9).

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