Current Practice

Radiology in the Management of Asymptomatic Renal Space-occupying Lesions

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The management of asymptomatic renal space-occupying lesions has always been a problem in urology. Some clinicians feel that if the patient is fit, exploration of the kidney is the only safe management,¹ while others advocate routine exploration only in younger patients.^{2,3,4}

Improvement in diagnostic techniques, notably renal angiography and cyst puncture, now makes it possible to distinguish between a renal tumour and a renal cyst with a high degree of accuracy. We therefore believe that exploration can be reserved for patients in whom there is doubt, whatever their age.

In this paper we describe the management of 43 patients who had asymptomatic space-occupying lesions.

Material

Forty-three patients who were found to have incidental space-occupying lesions on intravenous pyelography performed for urological symptoms, hypertension, or a loin mass were seen and investigated over the past six years (see Table).

Indications for Intravenous Pyelography in 43 Patients

Recurrent urinary tract infection	10
Prostatism	9
Renal colic	7
Loin mass on clinical examination	6
Hypertension	4
Haematuria (for which another cause was found)	3
Polycythaemia	2
Chronic renal failure	1
Albuminuria	1

There were 31 men average age 55.2 years (range 24-71), and 12 women, average age 55.4 years (range 41-76). In 25 patients the space-occupying lesion was on the right, in 17 on the left, and in one there were bilateral lesions. Forty patients had a single lesion and the remaining three multiple lesions.

Radiological Methods

All patients had intravenous pyelograms with abdominal compression. Tomography was used if necessary to define the renal outlines and collecting systems. Four in whom the intravenous pyelogram was not of diagnostic quality were subjected to retrograde pyelography.

Selective renal angiography with serial films on the side of the mass, or on both sides in the case of patients with bilateral lesions, was attempted in all those who had angiograms. In nine patients selective catheterization was impossible, and flood aortic injections of contrast medium were made with a catheter above the renal arteries. In three patients catheterization of either femoral artery was impossible, and a high translumbar aortogram was therefore performed. In the non-selective studies careful radiographic coning to the lesion was carried out to produce the maximum detail.

Six patients had cyst puncture in addition to angiography and two had cyst puncture alone. The cyst aspirate was subjected to cytology.

Results

In 38 patients the space-occupying lesions were considered on radiological grounds to be simple cysts and were managed conservatively. Twelve of them have been followed up for less than a year or have been lost to follow-up altogether. Of the remaining 26 six have been followed up for more than one year, 4 for two years, 11 for three years, and 5 for five years. In none of these 26 has there been any evidence of a missed carcinoma. Five patients were explored. Of the two with hypertension one had a nephrectomy; the other had a cyst uncapped, as it was thought that the cysts might be contributing to the hypertension.

In one patient the angiogram raised a suspicion of malignancy, as the lesion was not clearly defined; but a simple cyst was found at exploration, and this was uncapped. In another patient the cystogram showed an irregular wall, and suspicious cells were found in the aspirate. Nephrectomy had to be carried out, but histologically the lesion was found to be a simple one. In the fifth patient, whose only abnormality on the intravenous pyelogram was a slight bulge on the lateral aspect of the kidney (Fig. 1), a pathological circulation was shown on the angiogram; a carcinoma was found and a nephrectomy performed.

Discussion

The predominance of males in our series may be accounted for by the fact that in males of this age group intravenous pyelography is commonly performed for lower-tract obstruction. Our technique for renal angiography and its interpretation is similar to that described by others. A definite diagnosis of malignancy was made only when unequivocal pathological circulation was demonstrated (Fig. 1).

A renal cyst was diagnosed when a spherical or multilocular, clearly defined, relatively translucent, space-occupying lesion was shown in the nephrogram phase without any suspicion of pathological vessels.

A suspicion of malignancy was raised if doubtful pathological vessels were observed, if the lesion had the same or an increased nephrographic density compared with the renal substance, or if the lesion was poorly demarcated from the surrounding kidney or its edges were irregular.⁵⁻⁹

On cyst puncture^{3,4,10,11} a simple cyst was diagnosed when the contrast-filled lesion was smooth, thin-walled, and spherical in outline without any evidence of a filling defect either within the cavity or extending from the wall (Fig. 2). Clear cyst aspirate favoured a simple cyst, but the finding of altered blood raised the possibility of malignancy. The presence of malignant or suspicious cells on cytology was considered an indication for exploration. The incidence of malignancy in patients with asymptomatic space-occupying lesions is about 1 in 20.²

Usually it is impossible on pyelographic grounds to distinguish a tumour from a cyst, and for this reason the additional radiographic methods of renal angiography and cyst puncture were used. In distinguishing a renal cyst from a tumour angiography is claimed to have a diagnostic accuracy between

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FIG. 1.—(A) I.V.P. Renal outlines not clearly shown. (B) Tomogram of I.V.P. Note bulge on lateral border (arrowed). (C) Angiogram showing tumour circulation.

FIG. 2.—(A) I. V. P. showing central space-occupying lesion. (B) Nephrogram phase of angiogram showing spherical translucency. (C) Cyst puncture. Simple cyst outlined with contrast medium.

94 and 99%.^{6,7,8,12} We do not claim this degree of accuracy for angiography alone, but if doubtful cases are subjected to nephrotomography^{13,14,15} the diagnostic accuracy of the combined methods approaches 100%.⁹ We have ourselves preferred cyst puncture to nephrotomography, which has the added advantage of allowing cytology to be carried out—a further safeguard against missing a tumour arising from a cyst wall.

Of the two patients on whom cyst puncture alone was carried out one was elderly and considered a poor anaesthetic risk, and in the other, who had hypertension, it was thought that the space-occupying lesion shown on a routine pyelogram was almost certainly of no significance. We have carried out cyst punctures only on those patients whose radiological findings were suggestive of a simple cyst, as we have felt that puncturing a carcinoma might cause metastatic spread.

We have had no complications in this series from angiography, and only minor ones, such as transient haematuria and loin pain, after cyst puncture.

There have been several reports of coexisting renal cysts and carcinoma of the kidney,^{16,17} but it is commoner for the two lesions to be separate. In a critical review of 1,007 cysts and tumours^{18,19} no tumour was found within a benign cyst and only one in close proximity to a cyst. Even if the tumour were in the cyst wall it should be possible to identify one 2 cm. in diameter by angiography and cyst puncture.²⁰

Against the slight risk of missing a renal carcinoma the morbidity and mortality from renal exploration have to be considered. Thus Kropp *et al.*¹ had a mortality of 1.6% in 126 explorations, and Plaine and Hinman² a mortality and morbidity of 2.4% in 387 explorations.

It has been our policy to perform angiography in all cases where renal space-occupying lesions have been found incidentally on intravenous pyelography, and if in doubt to proceed to cyst puncture or exploration. Indeed with small centrally-placed lesions it may be impossible to differentiate between a cyst and carcinoma on exploration without nephrectomy.

Five out of 43 patients were explored and in one a carcinoma was found. This incidence is half that expected by Plaine and Hinman,² but the numbers are small and it must be admitted that the follow-up in some cases has not been long enough to exclude a missed carcinoma, especially as some lesions can be extremely slow growing.²¹ Nevertheless, we believe that this series indicates that asymptomatic space-occupying lesions found on routine pyelography need not be operated on provided that all available radiological data suggest that the lesions are simple.

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TODAY'S DRUGS

With the help of expert contributors we print in this section notes on drugs in common use.

Immunization Schedules

Apart from vaccination against smallpox, which remained compulsory for almost 100 years, immunization against the infectious diseases of childhood began on a national scale in Britain in 1940 with a campaign to eradicate diphtheria. At irregular intervals since that time new vaccines have been developed, so that today every child can be protected not only from diphtheria but also from tetanus, whooping cough, tuberculosis, poliomyelitis, and measles. The introduction of each new vaccine and an expanding knowledge of immunoprophylaxis have, inevitably, been associated with problems which are both administrative and immunological, and it has been necessary on several occasions during the past 20 years for modifications to be made to the schedules recommended for the vaccination of children. Understandably it has been difficult for those not immediately concerned with this work to keep up with all the reasons for these changes.

The efficacy of a vaccination schedule depends on a large number of factors, many of which are inter-related in very complex ways. The age of the vaccinee determines the immunological maturity, and both this and a high titre of remaining maternal antibody can depress the responses to immunizing antigens. Once immunization has been started, the size of the doses, their spacing, the quality of the antigens, and the incorporation in the vaccine of adjuvants can affect the response of the child—thus profoundly affecting the degree of protection that is achieved. When a number of antigens are combined in a single preparation, as in diphtheria-tetanus-pertussis vaccine, they need to be administered in appropriate proportions so that none is "crowded out". Furthermore, when live attenuated virus vaccines are used it is theoretically desirable to administer them at an interval of at least three weeks to avoid the possibility of simultaneous viraemia with each of the viruses. Lastly, there are the important requirements that the reactions, both local and general, to each vaccine should never be more than trivial, and that the schedule should be so arranged that the number of visits that each child makes to the vaccination clinic is kept to a minimum.

In order that the modern schedules of immunization may be more meaningful we must consider many points mentioned above in more detail.

When to Start Vaccination

It is easy to understand how there has been a controversy over the time when immunization should start. The paediatrician, anxious to begin the course before the baby leaves hospital and suffers exposure to infectious diseases, has often been at variance with the immunologist, familiar with the antibody responses and their persistence throughout the life of the child. Trials concerning antibody responses inevitably take a long time since both initial responses and persistence are important, as indeed is the timing of the booster doses. Hence the slow and what may appear to be frequent changes

in schedules. The age at which to start immunization, therefore, has given rise to much discussion, and postponement until 6 months is now considered to be the most sensible decision mainly for two reasons.

Perkins, Yetts and Gaisford,^{1,2} working with killed poliomyelitis vaccine, found that maternal antibodies to poliomyelitis circulating in infants at birth were of such a high titre that in most of them active immunization was either suppressed or completely inhibited. Even in those children in whom there were no circulating antibodies it was observed that the older the child at the start of immunization the better the antibody response.³ Thus it is important to delay the start of immunization in order that the maternal antibody titre may fall to non-inhibitory levels and to allow the infant to reach immunological maturity. These findings are not unique for poliomyelitis antigens: similar observations have been made for diphtheria⁴ and whooping cough.⁵ Furthermore, immunization with a living attenuated virus such as measles must also be delayed because of inhibitory levels of maternal antibody interfering with the establishment of infection.

Spacing of the Doses

A further factor in the interests of better responses is the spacing of the doses. It has been common practice for many years to give the doses at intervals of 4 weeks, since it has been argued that such a spacing is easily remembered by the mother. Studies of immunized children, however, have clearly shown that intervals between the first and second doses of 6 to 8 weeks and between the second and third doses of 6 to 8 months give a much better immunological response. It is important to emphasize that the full course of primary immunization is not complete until after the third dose is given, some 8 to 10 months after the course has started. The immunity provided by doses spaced at these longer intervals is in most children excellent and will certainly provide protection for the child through the first 5 years of life. At the time of entry to primary school booster doses should be given. This is a most important part of protection against the diseases most frequently transmitted by young children, and school entry is perhaps the first time that most children become heavily exposed to them all. The new findings on the spacing of the doses have been taken into account in the booklet on "Immunization against Infectious Diseases"⁶ published by the Department of Health and Social Security.

Quality of the Antigens

Another most important consideration is the quality of the antigens used for immunization. Tetanus toxoid in simple solution is a very good antigen capable of stimulating both primary and booster responses. Though the quantity of antigen needed to stimulate an antibody response in man sufficient to provide protection against the disease is not accurately known, it is considered that the primary course of immunization should evoke a circulating antitoxin titre of 0.5 international units (I.U.) per ml. of serum measured 6 months