PAPERS AND SHORT REPORTS

Percutaneous nephrolithotomy

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Abstract

A new method of removing calculi from the renal collecting system, in which the large and traumatic incision in the loin currently used is unnecessary, was attempted in 31 patients. Small dilators were introduced over a guide wire through a nephrostomy tube into the renal pelvis and a catheter inserted. The track was dilated in stages and two days later the nephrostomy tube was removed and a cystoscope introduced into the interior of the kidney. A stone basket was introduced down the operating channel of the cystoscope and manoeuvred to secure the stone; the cystoscope, stone basket, and stone were then removed. The procedure failed in 11 of the 31 patients, in five because the needle could not be placed accurately initially and in six because the stone could not be removed despite the establishment of a nephrostomy track. In the remaining 20 patients the procedure was successful.

This procedure is far less traumatic than the conventional operation. With the development of a flexible nephroscope and an ultrasonic stone disintegrator it will be possible also to remove larger stones and stones in the peripheral calices using this method.

Introduction

The need to make a large and traumatic incision in the loin to extract a relatively small calculus from the renal collecting system has always been a major disadvantage of operations for renal stones. In the past few years techniques have been developed whereby percutaneous nephrostomy may be performed by radiologists, and this has added a new dimension to the management of small mobile renal calculi within the major collecting system. The procedure of passing a fine nephrostomy tube into the kidney by direct percutaneous puncture, dilating the track, and then inserting a device to remove the stone has now become an attractive proposition. Such a concept has been exploited by Alken and Günter in West Germany.[1] We have explored this method further and have removed several stones from the interior of the kidney by percutaneous puncture alone. We report here our results.

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Patients and methods

The patients selected for treatment were those in whom the intrarenal collecting system was of reasonable capacity and contained a calculus of not more than 2·5 cm in transverse diameter. In most cases a mobile calculus had been causing intermittent obstruction of the pelviureteric junction, with considerable pain and discomfort to the patient often coupled with haematuria and urinary tract infection.

A percutaneous Teflon-sheathed needle was introduced under local anaesthetic into the major renal collecting system in the conventional way. This was done with the patient in a prone oblique position in order to gain access to the renal collecting system transparenchymally. When the collecting system had been entered satisfactorily the needle was removed and a fine guide wire pased through the Teflon sheath into the renal pelvis. Small dilators were then introduced, a pigtail catheter (8 French gauge) inserted over the guide wire, and the guide wire removed. If the catheter was found to be lying in a good position it was secured at the skin surface and the patient either remained in hospital or returned home.

One or two days later the patient was seen again. A guide wire was passed through the catheter, which was then removed. If no appreciable bleeding occurred the track was fully dilated at one session to 22 or 24 French gauge depending on the size of the calculus to be extracted. Occasionally dilatation had to be performed in two stages on separate days. Intravenous pethidine and diazepam were given if needed as well as local anaesthetic during dilatation.

Two or three days after the dilatation the patient was taken to the operating theatre, where under a short general anaesthetic the nephrostomy tube was removed and a standard Storz 21 French gauge cystoscope with a 30° telescope introduced into the interior of the kidney. Irrigation was by means of physiological saline.

Usually the stone could be easily identified lying within the renal pelvis or calices. A Pfister-Schwartz or Vance stone basket was introduced down the operating channel of the cystoscope, and manoeuvred to secure the stone. The cystoscope plus stone and stone remover was then withdrawn through the nephrostomy track.

The procedure was carried out with little discomfort to the patient. No attempt was made to suture the nephrostomy track, which in all cases closed spontaneously within the next 24 hours. The patient could leave hospital on the day after the procedure.

Results

This technique was attempted in 31 patients but failed in 11. In five failure occurred because the needle could not be placed accurately at the start of the procedure, most difficulty being experienced with a particularly high kidney lying under cover of the lower rib cage. These patients were in hospital for only one day; they returned later for a conventional operation. In six patients, despite the establishment of a nephrostomy track, the stone could not be removed. In four the stones were so embedded in the mucosa that they could not be dislodged with the stone-retrieving baskets initially available. These were all early cases, and we think that now, with further experience and our present equipment, such stones could be secured. In one of the two remaining cases the nephrostomy track was slightly circuitous and did not permit a straight endoscopic approach to the stone, while in the other a small perforation was made in the renal pelvis with the stone-grasping forceps and we thought it wise to abandon the procedure for fear of extravasation of the irrigating fluid. In all six patients the stones were removed conventionally at the same operative session as the attempted extraction.

Of the remaining 20 patients, all had their stones removed satisfactorily percutaneously.

Discussion

Obviously, removing small stones from the intrarenal collecting system in the manner described has considerable advantages over the conventional operation and is far less traumatic. Not only is long-term admission to hospital unnecessary but the morbidity of the whole procedure is small compared with that inflicted by the conventional loin incision.

So far we have used this method only for stones that are free within the renal pelvis or in major calices. With a flexible nephroscope that is being developed we should be able to extend our activities to the peripheral calices. It will be possible to turn the tip of this nephroscope through 130° and to negotiate the caliceal neck.

With more recent experience we are convinced that the failure to secure the stones down the established track in six cases would not have occurred with the newer instruments now available. In fact, only one failure has occurred in our last 16 patients.

Larger stones also present problems but with a new ultrasonic stone disintegrator (Messrs Richard Wolf Ltd), which may be passed down a pre-established nephrostomy track, the stone may be shattered and the fragments removed percutaneously. This method was satisfactorily performed in one of our patients, and we intend to use this new instrument extensively.

We are convinced that this form of endoscopic manipulation of intrarenal calculi will rapidly become established as the expected norm for the removal of most renal calculi and that the considerably more traumatic access operation presently used will become obsolete.

References

1 Günter R, Alken P, Altwein JE. Percutaneous nephrostomy—possible applications and results. *ROEFO* 1978;**128**:720-6.

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Accuracy of early estimation of maturity at a district general hospital

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Abstract

The accuracy of routine sonar scanning of patients attending the antenatal clinic of a general hospital before the 19th week of pregnancy was calculated and compared with the potential accuracy of the techniques used. Out of 200 patients who went into labour spontaneously, 164 delivered within nine days of the sonar prediction, and 152 delivered within nine days of the date estimated from the menstrual history. The discrepancy between the mean of the expected date of delivery from the sonar examination and that derived from the menstrual history was 2·24 days. When the two estimations differed by a week or more the sonar estimation was more accurate, and all 44 patients in this group delivered by the sixth day after the sonar prediction.

These findings emphasise the need for those providing a similar service to review the accuracy of their own work.

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Introduction

A sonar scan during the first half of pregnancy is an established feature of modern obstetric practice.[1] Though an early scan allows an opportunity to identify such problems as multiple or blighted pregnancy and adnexal mass, the primary objective of the "booking" scan is to estimate maturity. This information may be needed to interpret biochemical data and improve management of the later stages of pregnancy.

Gestational age may be calculated by measuring the crown-rump length of the fetus in the first trimester or the biparietal diameter later.[2-5] The proved accuracy of these methods, however, may not always be reflected in the results obtained from the busy sonar room of a general hospital.

After a trial of maternal α-fetoprotein screening in King's Lynn[6] the quality of obstetric sonar scanning was reviewed. While the estimation of fetal maturity was of considerable value, the accuracy was less than had been expected.

Patients and methods

A retrospective survey was carried out on two groups of consecutive patients, all of whom were delivered of a single live baby after going into labour spontaneously; were sure of the date of their last menstrual period, and had been examined by sonar before their 19th week of pregnancy as estimated by sonar examination. Two hundred patients were reviewed. One group of 98 patients had been examined with a