

## AUDIO AMPLIFICATION IN PYELOLITHOTOMY AND NEPHROLITHOTOMY

ROBERT ZUFALL AND WILLIAM POMERANTZ

*From the Dover General Hospital, Dover, New Jersey*

Removing stones from the renal pelvis and calyces can be difficult and time consuming. Of the various instruments used, the Randall forceps is probably the most popular. Portable x-rays are often used and needles are stuck into the kidney to localize the stones. Creevy developed a stone basket.<sup>1</sup> Dees used a fibrinogen coagulum to trap stones.<sup>2</sup> Schlegel has used ultrasound to localize calculi.<sup>3</sup>

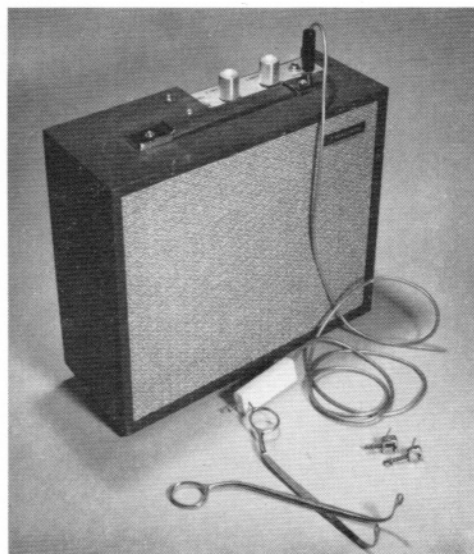
Ordinarily the stone is detected by the grating sensation noticed as it is touched by the forceps. We have been able to detect these stones easier by amplifying the grating sound of the forceps on the stone.

Audio amplifiers have been used to localize stones in the common bile duct<sup>4</sup> and a kidney stone detector of this type is mentioned by Priestley as being available but expensive.<sup>5</sup> In the 15 years since these reports, amplifiers have improved greatly in fidelity, portability and inexpensiveness and their re-evaluation seemed worthwhile.

### METHOD

An inexpensive battery-powered guitar amplifier was attached via a phonograph jack and cord to a 78 revolutions per minute phonograph pickup head. The amplifier is battery-powered to minimize electrocution hazard.<sup>6</sup> A small C-shaped screw clamp, which could be fastened to any instrument, was welded to a short, hard, steel pin.

This could then be inserted into the pickup head like a phonograph needle. A similar steel pin was welded to a Randall forceps and inserted directly into the pickup head which acted as a crystal sensor. The pickup head, cord and jack were sterilized with gas and kept in a sterile pack. At operation the jack was plugged into the amplifier, which stood under the table, and the pin was inserted into the pickup head (see figure).



The amplified sound of the forceps rubbing on the kidney was a soft hissing or scratching. The sound when it struck the stone was easily recognized as a louder, coarser, grating noise.

This procedure was used in 4 pyelolithotomies and 5 nephrolithotomies. In all cases the sound was characteristic and we believed the operations were performed quicker and easier. After the stones were removed, exploration of the kidney for residual fragments was facilitated.

In 2 ureterolithotomies the amplifier was used but was not considered especially useful. Perhaps it could help to detect stones near the bladder.

Accepted for publication December 20, 1968.

<sup>1</sup> Creevy, C. D., cited by Campbell, M.: *Clinical Pediatric Urology*. Philadelphia: W. B. Saunders, p. 901, 1951.

<sup>2</sup> Dees, J. E.: The use of a fibrinogen coagulum in pyelolithotomy. *J. Urol.*, **56**: 271, 1946.

<sup>3</sup> Schlegel, J. U., Diggon, P. and Cuellar, J.: The use of ultrasound for localizing renal calculi. *J. Urol.*, **86**: 367, 1961.

<sup>4</sup> Kirby, C. K.: Instrument for the detection of gallstones in the bile ducts. *Amer. J. Surg.*, **80**: 133, 1950.

<sup>5</sup> Priestley, J. T.: *Surgery of the kidney*. In: *Urology*. Edited by M. F. Campbell. Philadelphia: W. B. Saunders, pp. 1796-1797, 1954.

<sup>6</sup> Bruner, J. M.: Hazards of electrical apparatus. *Anesthesiology*, **28**: 396, 1967.

The amplifier was also attached to the Dormia stone basket in 5 cystoscopic stone extractions but extraneous noises from the catheter passing through the cystoscope and ureter obscured any stone sound that might have occurred.

#### SUMMARY

An audio amplifier has been attached to the Randall stone forceps to aid in finding and removing calculi of the renal pelvis and calyces. The procedure was definitely helpful.