Urol Res (1990) 18:57–58

Urological Research

"Dry lithotripsy" by a simple modification of the Chinese lithotripter KDE-1

W. Wu, H. Wu, and X.-M. Zhou

Nanjing Railway Medical College and Chinese Academy of Science, Nanjing, People's Republic of China

Accepted: June 1, 1989

Summary. We report on the improved technique upon a water bath lithotripter. With a simple water balloon device added to the Chinese KDE-1 Type water bath lithotripter, an extracorporeal shock wave dry lithotripter has been developed. From June to December 1988, there were 300 cases of upper urinary tract calculi and gallbladder stone treated with this machine with excellent results and no severe complications. The improved technique would be made reference to change old water bath machines into dry (water balloon) machines.

Key words: ESWL – Water bath – Dry lithotripter – Water balloon

Extracorporal shock wave lithotripsy (ESWL) was developed between 1975 and 1984. The initial clinical studies by Chaussy and associates [1] and others [2] have revolutionized the treatment of renal stones. ESWL is now the accepted treatment of choice for the majority of renal calculi. In addition, it is being used for the treatment of gallbladder calculi.

China has developed a lithotripsy system of its own (the KDE-1 lithotripter) [3]. We present a simple modification to be used with the KDE-1 lithotripter that allows for dry operation of the machine. Additionally, the results of the first 300 treated patients are presented.

Technical modification

Similar to the Dornier HM-3 lithotripter the KDE-1 shockwaves are generated by spark gap and transmitted to the patient via a fluid medium [1]. The stones are located radiologically.

In Fig. 1 the modifications of the KDE-1 lithotripter are outlined. A water balloon is sealed air-tight on the semiellipsoid reflector. The water balloon is water-filled by elevation of the water reservoir to the height "h". Excess air is eliminated by an exhaust pipe. Ton ensure effective transmission of the shockwaves to the patient the surface of the water balloon is covered with coupling gel. By these simple means the original water bath machine is modified into a "dry lithotripter".

Clinical results

300 patients with upper urinary tract calculi and gallbladder stones have been treated with the modified machine. Patients age ranged between 21 and 62 years. The number of shock waves applied ranged from 500 to 2,800 with a voltage of 9 to 16 kV.

99.2% of all stones treated were disintegrated. 90% of the patients were treated in a single session, 9% required two and 1% three or more sessions.

With the modified machine treatments could be performed without anesthesia. The reason for this phenomenon is not completely clear. We think, however, that the flexible membrane of the balloon filters some of the low frequency and stray waves. The transmitted shock waves are of higher frequency, and do not causing pain.

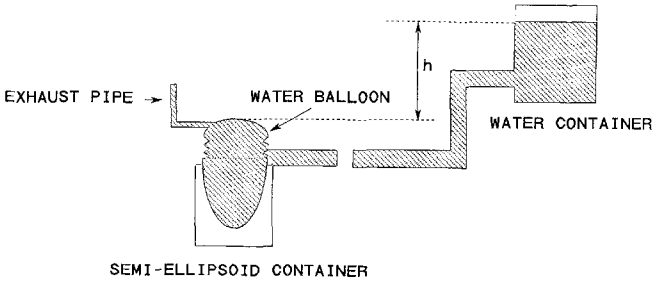

Fig. 1. Schematic diagram of the water balloon device

Conclusion

With a simple modification we have changed the original Chinese water bath KDE-1 lithotripter into a dry lithotripter.

By this, patients positioning has become easier. In addition, the treatment has become anesthesia-free without impairing the high success rate.

References

1. Chaussy C (1982) First clinical experience with extracorporeally induced destruction of kidney stones by shock waves. J Urol 127:417
2. Rhiele RA (1987) In: Principles of extracorporal shock wave lithotripsy. Churchill Livingstone, New York Edinburgh Melbourne
3. Zhang L-S (1986) The research on electrohydraulic shock wave lithotripsy. Adv Tech Electron Eng 37:40

Wu Wei, MD
Department of Urologic Surgery
Nanjing Railway Medical College
210009 Nanjing
People's Republic of China