A hydrophone transducer (Celesco LC 5-2, Canoga Park, CA) was used to detect the pressure wave. The cylindrical lead zirconate titanate ceramic element was enclosed in a waterproof Neoprene sheath (2 × 4 mm) and has a response of −130 dB (ref. 1 V/μbar) for the pertinent range of frequencies (1–400 kHz). The directivity pattern is circular in the transverse plane at both 80 and 400 kHz. The hydrophone transducer was inserted stereotaxically through a matrix of holes on the skull into the brain tissue of cats and advanced precisely to desired locations using an electrode manipulator. Microwave-induced pressure wave detected by the transducer was conditioned using a high gain amplifier and a bandpass filter with cutoff frequencies at 1 kHz and 1MHz (Tektronix AM502). The first 100 μs of response was displayed on an oscilloscope (Tektronix 5111A) and photographed on Polaroid film. In addition, a fast Fourier transform (FFT) of the response was obtained using a digital oscilloscope (Nicolet 4094, Madison, WI).

RESULTS AND DISCUSSION

Some typical hydrophone output waveforms are shown in Figure 3. Hydrophone responses detected in brain tissue at the same depth (27 mm) through five midline holes (1–5) are shown in Figure 3a. Signals detected at the same five holes but along a straight line from the applicator are shown in Figure 3b. The time delay associated

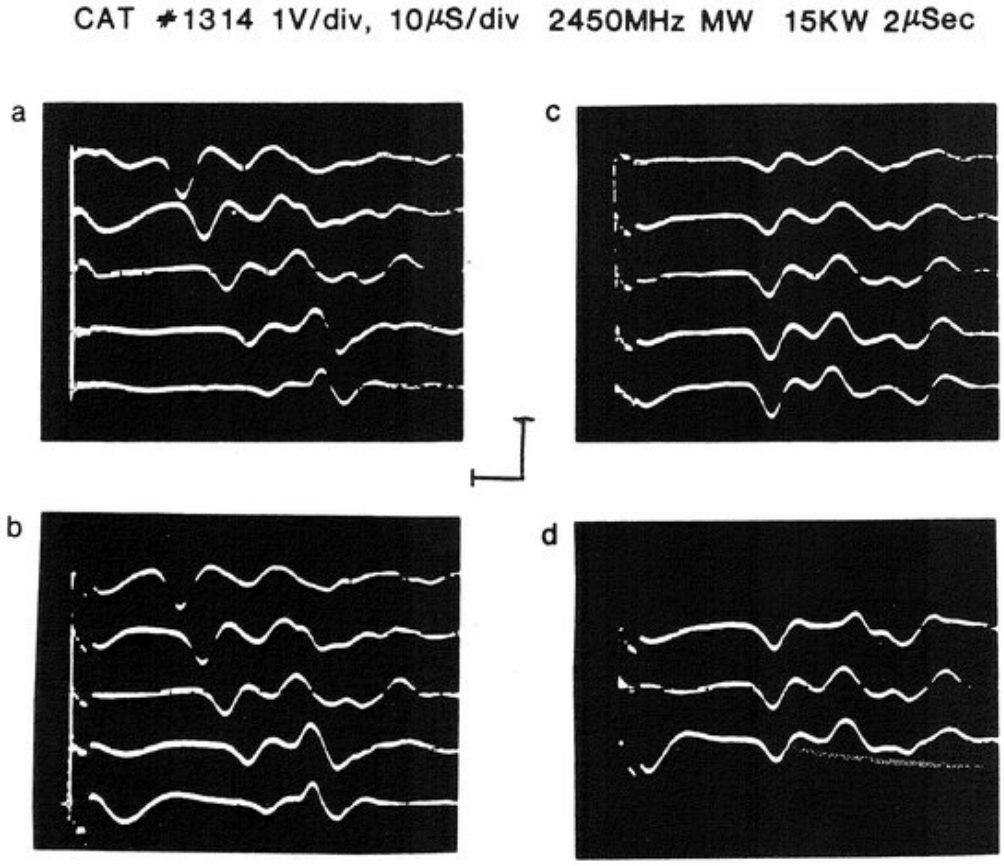

Fig. 3. Typical response from hydrophone implanted inside a cat brain. (**a**) Holes 1–5 at equal depth: 27 mm; see line A of Figure 2b. (**b**) Holes 1–5 at depth levels of 26, 26.5, 27, 27.5, and 28 mm, respectively; see line B of Figure 2b. (**c**) Hole 3 at different depths: 23, 25, 27, 29, and 31 mm; see line C of Figure 2b. (**d**) Holes 8, 3, and 13 at the same depth: 27 mm.