



Conventional and contrast-enhanced ultrasound assessment of craniocerebral gunshot wounds

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ABSTRACT. This study aimed to investigate the characteristic features of craniocerebral gunshot wounds by conventional ultrasound (CUS) and evaluate the efficacy of contrast-enhanced ultrasound (CEUS) in differentiation of tissue condition in wounds. Twenty crossbreed dogs (treatment: N = 15; control: N = 5) were used in the study. Pipe-shaped hyperechoes of varying size were found by CUS in most of the treated animals. The echoic areas were distinct from the neighboring brain tissue and did not change with time. CEUS revealed that the pipe-shaped echo was unenhanced in majority of the injured brains and the surrounding tissue was either heterogeneously enhanced or unenhanced. Pathological analysis confirmed that the contrast-filling-defect area indicated necrotic tissue and the heterogeneous minimally enhanced areas indicated degenerative tissue. CUS imaging enabled detection of hematomas and CEUS indicated that the filling defect was in the center

of the hematoma, with enhancement gradually increasing towards the periphery. CUS could effectively detect a wound tract, hematoma, and the craniocerebral area injured by a gunshot, while CEUS could accurately reveal necrotic tissue in the injured area and differentiate the degenerative from normal tissue.

Key words: Conventional ultrasound; Contrast-enhanced ultrasound; Crossbreed dogs; Brain; Gunshot wound