IMAGING OF THE HEAD OF NEWBORN PUPPY BY 7-TESLA MRI

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Introduction: Canis familiaris is a species among companion animals with the most wide breed dimorphism. An individual can reach body weight up to 45 times larger than that of another individual under the same species. Significant breed and specimen variety is shown also in the head, which under some conditions could cause dystocia of foetal origine. Based on craniometric measurement, for instance cranio-facial angle, dogs are classified into three types: mesaticephalic (most common), dolichocephalic and brachycephalic. Each of the variants represents a group of morphological differences that causes predispositions to a range of diseases (Aron and Crowe, 1985). The need in this classification arises due to possibility of free crossing between the types, which might complicate diagnostic procedure. There is necessity of introduction more accurate diagnostic methods of examination and description standards taking into account the type, breed and age of the animal. Such attempts have been made for adult animals (Kupczyńska, 2007), but there is lack of systematic data available for newborn puppies. New imaging techniques such as high-field MRI could be very useful in this area.

Material and methods: A dead newborn Labrador puppy with no clinical signs of pathology was examined. After gathering of photographic documentation testing with 7-tesla MRI Bruker (parameters - TR: 4300.0 ms; TE: 36,0 ms; ET: 8; Flip Angle 180,0; Slice location 34,43 mm; Slice thck: 0,80 mm; Spacing: 2,00; Bit depth 16; Frame size: 70 x70 mm) was performed.

Results and discussion: MRI tomography scans showed clearly the structures: encephalon (olphactory bulb, subarachnoid space, hypothalamus, pituitary gland, ventriculi laterales, corpus callosum, brain stem, pons), eyeballs with optic nerves and muscles of the eyes, fontanelle, tooth bud, cranium sutures. In the future this kind of research in veterinary practice will allow fast diagnosis and clinical evaluation of encephalon for developmental changes in newborn puppies, for example when hydrocephalus is suspected (Jung-Woo Nam et al., 2011). Correct interpretation of the results involving consideration of the breed specificity together with individual features is required, which needs a thorough knowledge and deep understanding of clinical anatomy. Using of high-field systems improves significantly resolution of tomograms which increases diagnostic value of structural examination of the brain in companion animals and provides an opportunity to develop functional methods of clinical examination as alternative to invasive techniques.

Figure I, II – MRI transversal scan of the head of the puppy – 1 = eyeball, 2 = isthmus of the fauces , 3 = falx cerebri, 4 = mandible, 5 = sagittal sinus of dura mater, 6 = white matter, 7 = optic nerve

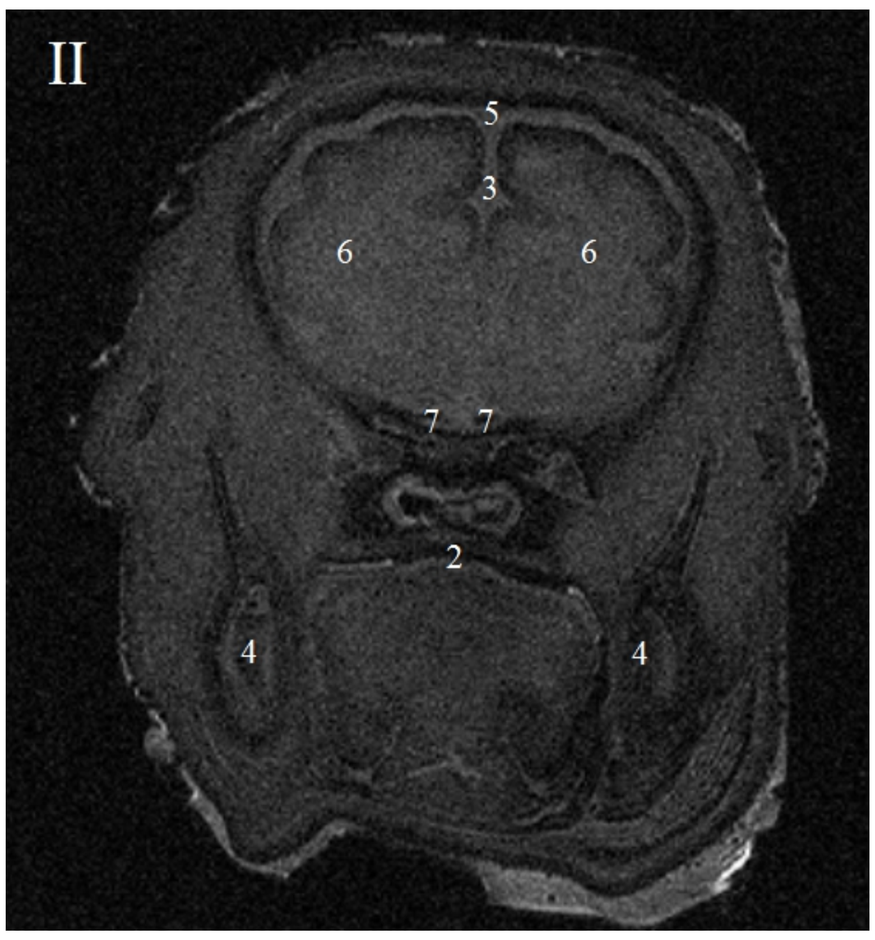
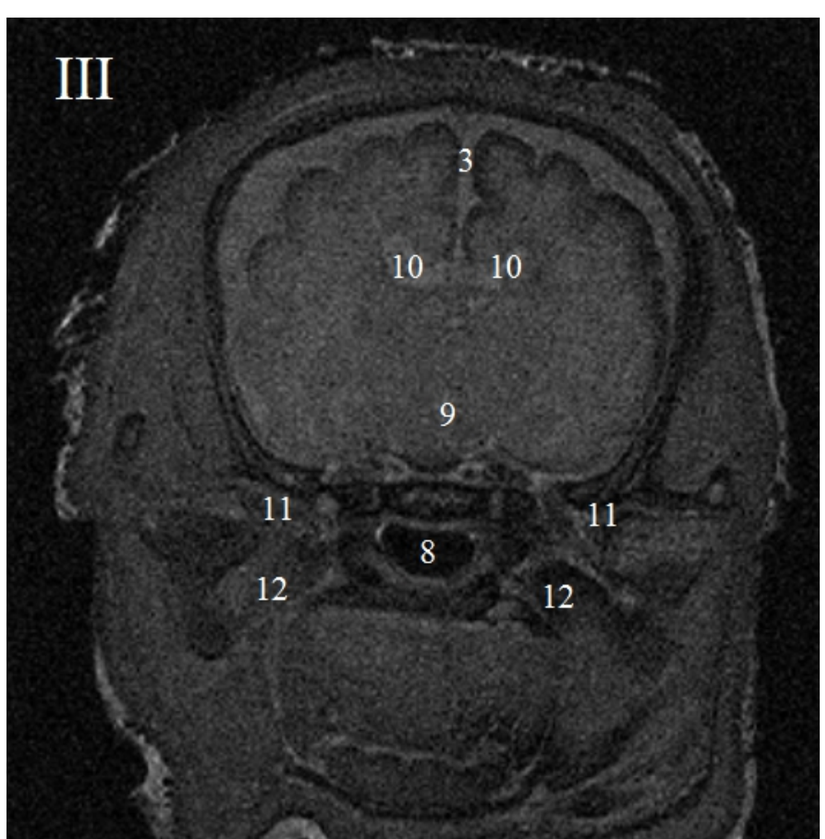
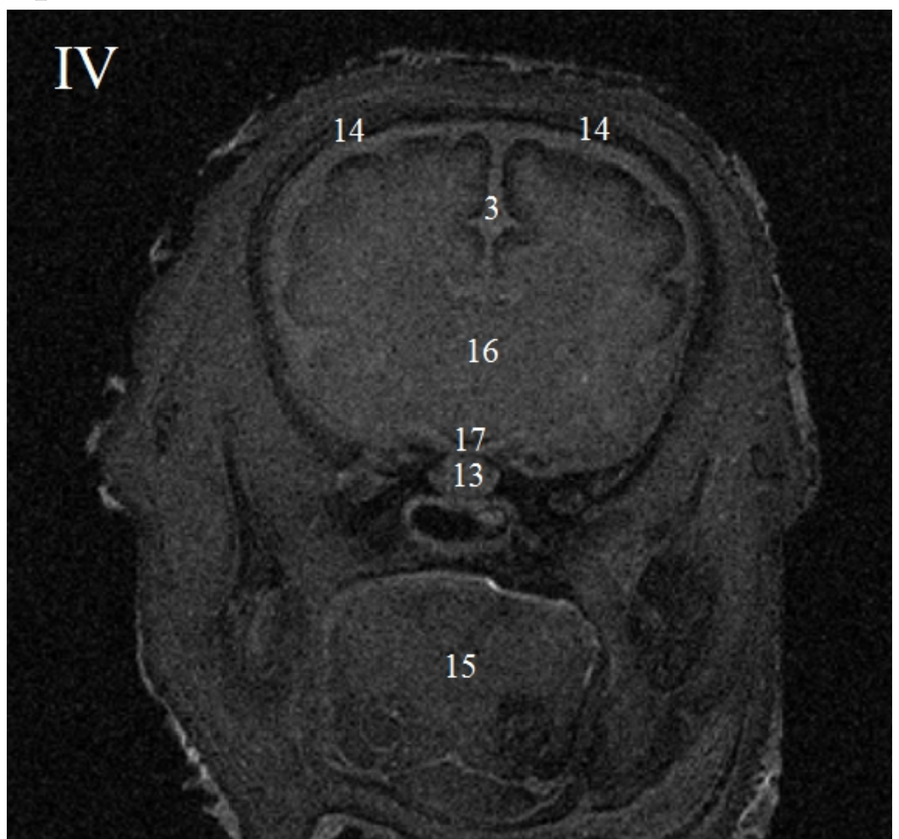


Figure III, IV – MRI transversal scan of the the head of the puppy – 3 = falx cerebri, 8 = posterior nasal apertures, 9 = third ventricle, 10 = lateral ventricle, 11 = lateral pterygoid muscle, 12 = medial pterygoid muscle, 13 = pituitary gland, 14 = subarachnoid space, 15 = tongue, 16 = interthalamic adhesion, 17 = optic chiasm





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