Sonography of the nasal cartilage: technique and normal anatomy

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Abstract The cartilaginous parts of the nose may be involved in a wide range of pathologies ranging from trauma and infection to malignancy. If pathology is suspected on examination, an easy-to-use imaging modality would be helpful in everyday clinical work. Until now, sonography of the nasal cartilage has not been described. This short letter describes the technique and normal anatomy of the nasal cartilage on sonography. Sonography may evolve into a powerful imaging tool in imaging of the nasal cartilage.

Keywords Ultrasound · Nasal cartilage · Anatomy

Sommario Le parti cartilaginee del naso possono essere coinvolte in una vasta gamma di patologie, che vanno dal trauma, alle infezioni, alle patologie maligne. Nel sospetto clinico, un esame di imaging, di facile esecuzione, potrebbe essere utile nella pratica quotidiana. Finora, l'ecografia della cartilagine nasale non è stata descritta. Questa breve lettera descrive la tecnica e l'anatomia ecografica normale della cartilagine nasale. L'ecografia potrebbe rivelarsi un valido strumento di imaging nello studio della cartilagine nasale.

The nasal skeleton consists of bony and cartilaginous parts. The cartilaginous parts or cartilaginous pyramids consist of the single septal cartilage and the symmetric lateral, greater and lesser alar cartilages [1]. Like the bony parts, they may be involved in a wide range of pathologies ranging from trauma and infection to malignancy. If pathology is suspected on examination, an easy-to-use imaging modality would be helpful in everyday clinical work. Because the cartilage is located superficially, sonography could be such an imaging test. Sonography of the bony parts of the nose in trauma is an established method [2, 3]. But, until now, to the best of our knowledge, sonography of the nasal cartilage has not been described. Sonography may have several advantages compared to other imaging tests. On radiography the cartilage can not be visualized. Because of the low soft-tissue resolution with computed tomography, dedicated imaging of the cartilage is impaired. Magnetic resonance imaging, beside from being expensive and not everywhere easily available, has problems in the resolution of the tiny anatomical structures of the nasal cartilage. In contrast, sonography is readily available, cheap, free of radiation and with the introduction of high-resolution probes imaging of subcutaneous structures is possible. The possibility of imaging superficial cartilage structure has been demonstrated by Wortsman and Jemec in their study on the sonography of the auricular cartilage [4].

For the imaging of the nasal cartilage, a linear high-frequency ultrasound probe (15 MHz) is mandatory. The lying patient is scanned in a supine position. With the use of enough amount of ultrasound gel no standoff pad is necessary. The lateral/alar cartilages show a typical layered appearance of hypoechoic and echogenic bands (Fig. 1). The septal cartilage shows a different and more homogeneous hypoechoic appearance (Fig. 2). These

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Fig. 1 Detailed view of the greater alar cartilage showing the typical bandlike appearance of the lateral and alar cartilages

differences in the echogenicity can be explained by their different ultrastructure [5].

For a systematic approach four standard examination planes should be scanned (Fig. 2). The first plane is a

longitudinal view of the back of the nose extending from the nasal bone to the tip of the nose (Fig. 2, upper row). In this plane the dorsal septum of the nose, where the symmetric cartilages are fused, can be seen. Ventral parts of the hypoechoic septal cartilage can be visualized in depth. This plane is followed by a longitudinal scan on each side of the nose (Fig. 2, lower row on the right). In this plane the normal lateral as well as the alar cartilages can be seen. The last plane is a scan from caudal, the probe is placed below the nasal tip and the septum from caudal (Fig. 2, lower row on the left). In this plane both greater cartilages and their fusion in the midline as well as parts of the caudal cartilaginous septum can be seen. As described above the different echogenicity of the lateral/alar cartilages in contrast to the septal cartilage can be seen.

In conclusion sonography of the normal nasal cartilage is feasible. Sonography may evolve into a powerful tool in the imaging of suspected nasal cartilage pathology. Hopefully this short report stimulates more research (case reports as well as systematic studies) on this interesting topic.

Fig. 2 Suggested imaging planes and normal anatomy in the examination of the nasal cartilage. The *upper row* shows a longitudinal view of the back of the nose extending from the nasal bone to the tip of the nose. In the *lower row* a scan from caudal onto the nose tip is shown on the *left*. On the *right* a longitudinal scan on the side of the nose can be seen

Conflict of interest The author has no conflict of interest.

Informed consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. All patients provided written informed consent to enrolment in the study and to the inclusion in this article of information that could potentially lead to their identification.

Human and animal studies The study was conducted in accordance with all institutional and national guidelines for the care and use of laboratory animals.

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