

Diagnostic Imaging of Reproductive Tract Disorders in Reptiles



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KEYWORDS

- Reproductive tract • Radiography • Ultrasonography • Computed tomography
- Chelonian • Snake • Lizard • Reptile

KEY POINTS

- Radiographs serve as a cheap and widely available imaging tool for getting an overview of the general condition in reptiles. Mineralized egg shells are differentiated in most species.
- Sonography allows the evaluation of the whole reproductive tract in lizards and snakes; however, the examination of chelonians is limited by the shell.
- Computed tomography is the perfect imaging tool for the visualization of all organ systems in chelonians.
- Diagnosis of dystocia should always be supported by diagnostic imaging, especially in chelonians where the shell hampers proper palpation.

Diagnostic imaging of the reptilian reproductive tract may be helpful for determining gender (particularly in monomorphic species),¹ for evaluating the breeding status,² for finding pathologic conditions, and for supervising treatment.³ This article demonstrates the most commonly used imaging techniques, including their advantages and disadvantages (**Table 1**). Physiologic appearance and pathologic findings of male and female reproductive tract are described and illustrated.

INTRODUCTION TO DIFFERENT DIAGNOSTIC IMAGING METHODS IN REPTILE MEDICINE

Radiography

Radiography is the most popular imaging method in reptiles because of its worldwide availability, ease of use, and predictable costs. Usually-whole body radiographs are performed. For chelonians, small and large lizards, and snakes dorsoventral and laterolateral views normally provide sufficient information for the reproductive tract. In chelonian species craniocaudal views may be used in addition, but are usually of

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Table 1
Comparison of the value of radiography, sonography, and plain computed tomography in differentiating various reproductive conditions

	Chelonians, Turtles			Lizards, Iguanas, Chameleons			Snakes		
	RX	US	CT	RX	US	CT	RX	US	CT
Ovary	0	+	++	0	+ / ++	+ / ++	0	+	+
Follicles, eggs with noncalcified shells	0 / +	++ / +++	+++	++	+++	+++	+ / ++	+++	+++
Eggs, poorly calcified shells	++	+++	+++	++	+++	+++	++	+++	+++
Eggs, well-mineralized shells	+++	+	+++	+++	++	+++	+++	+++	+++
Salpinx	0	+ / ++	+++	0	+	+	0	0 / ++	n.i.
Testes	0	++	+ / ++	0	+ / ++	+ / ++	0	+	n.i.

Abbreviations: 0, no value/organ not visible; + / ++ / +++ , little/moderate/high value; CT, computed tomography; n.i., no information available; RX, radiography; US, ultrasound.

main interest for diagnosing respiratory tract disorders. Lateral views in turtles should be performed in horizontal view to minimize organ displacement and to ensure symmetric views. The animal is placed on a wooden block or a paper box for proper positioning (Fig. 1A). Small lizards should be done in a similar way, but rather be confined in a radiolucent box (Fig. 1B). Manual restraint in tiny species might hurt the patient and result in compromised images because of superimposition. Chameleons may be offered a kind of (preferably radiolucent) perch (Fig. 1C, D). For larger lizards and snakes either horizontal or vertical beam imaging is applied. Usually large lizards are restrained and positioned in a similar way to dogs or cats.⁴

One disadvantage of radiology is artifacts caused by superimposition. This can at least to some extent be overcome by always performing two radiographs in perpendicular directions. Restricting oneself to only one view results in considerable loss of information (discussed later).

Another disadvantage in reptile radiography is the lack of coelomic fat between the organs. Therefore differentiation of ovaries, follicles, or testes is difficult or even completely impossible, especially in chelonians. Mineralized egg shells are usually defined when proper imaging techniques are used. Superimposition of the shell hampers the visualization of eggs with poorly mineralized shells, especially in underexposed images. The easily applicable digital radiography might tempt to an excessive use of milliamperage and/or kilovolt to overcome this problem, which is certainly unacceptable for reasons of radiation protection.

Sonography

Sonography may be used more often in diagnosing reproductive disorders than radiography, particularly in snakes and lizards (eg, iguanas).⁵ The main advantage of sonography is the possibility to evaluate the inner architecture of soft tissues. Sonography is therefore a perfect supplement to radiography.³ Although radiographs serve the purpose of being documents that are evaluated anytime, sonographic diagnoses are made during the examination of patients. Even if videos are taken it is difficult to form a trustworthy second opinion about somebody else's images. Thorough training and detailed knowledge of different species and their sometimes unique anatomy are therefore prerequisites for performing sonography.

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