

CASE REPORT

MAGNETIC RESONANCE IMAGING DIAGNOSIS AND PARASITOLOGICAL VERIFICATION OF HUMAN SUBORBITAL DIROFILARIASIS

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ABSTRACT

Introduction. The presence of mosquitoes and the abundance of microfilariae in dogs are considered of great risk for invading humans with dirofilariasis. We present an extremely rare case of *Dirofilaria repens* in the periorbital subcutaneous area, diagnosed for the first time in Bulgaria by magnetic resonance imaging (MRI).

Case presentation. A 39-year-old woman presented for swelling of the eyelid and eye redness, sensation of movement, irritation and pain. MRI was performed in the axial, coronary and sagittal planes, with pulse sequences T1 W, T2 tse_dix, T2 vibe_fs. On the base of the anamnestic data and pathologic changes identified by MRI, which indicated the presence of *Dirofilaria*, the patient was referred to an eye surgeon. After the parasitological studies, two immature female parasites of the species *Dirofilaria repens* (larvae; Onchocercidae; Nematoda) were identified.

Conclusions. MRI is a non-invasive and effective diagnostic method for assessing changes in the proximity

RÉSUMÉ

Diagnostic d'imagerie par résonance magnétique et vérification parasitologique de la dirofilariose suborbitale humaine

Introduction. La présence des moustiques et l'abondance des microfilaires chez les chiens ont été évaluées comme les plus risquées pour envahir les humains atteints de dirofilariose. L'étude présente un cas extrêmement rare de *Dirofilaria repens* dans la région sous-cutanée périorbitaire, diagnostiqué pour la première fois en Bulgarie avec une imagerie par résonance magnétique (IRM).

Rapport du cas. L'IRM a été utilisée pour examiner une femme de 39 ans présentant un gonflement des paupières et une rougeur oculaire, une sensation de mouvement, une irritation et une douleur. L'étude a été réalisée dans les plans axial, coronaire et sagittal. Les séquences d'impulsions T1 W, T2 tse_dix, T2 vibe_fs ont été utilisées dans l'étude. Selon les données anamnestiques et les changements pathologiques

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and the affected areas of *Dirofilaria repens*, to determine the exact location, for subsequent surgical access and rapid removal of the parasite.

Keywords: diagnostic algorithm, *Dirofilaria repens*, magnetic resonance imaging.

INTRODUCTION

Dirofilariasis is a parasitosis encountered in animals and humans, transmitted by arthropods, with a fast spread in Europe^{1,2}. It may present very rarely as subcutaneous orbital swelling³. Often, dirofilariasis is misdiagnosed, and the nodules are perceived to be neoplastic tumours^{4,5}. We present an extremely rare case of *Dirofilaria repens* in the periorbital subcutaneous area, diagnosed for the first time in Bulgaria with magnetic resonance imaging (MRI).

CASE PRESENTATION

MRI was used to examine a 39-year-old woman with swelling of the left eyelid and eye redness, and

identifiés après l'IRM, qui indiquaient la présence de *Dirofilaria*, le patient a été référé à un chirurgien ophtalmologiste. Après les études parasitologiques, deux parasites femelles immatures de l'espèce *Dirofilaria repens* (larves, Onchocercidae, Nematoda) ont été identifiés.

Conclusions. L'IRM est une méthode de diagnostic inoffensive et efficace pour évaluer les changements dans la proximité et les zones affectées par *Dirofilaria repens*, afin de déterminer son emplacement exact, dont les résultats sont la base de l'accès chirurgical ultérieur et de l'élimination rapide du parasite.

Mots-clés: algorithme de diagnostic, *Dirofilaria repens*, résonance magnétique.

a week later, of the lower eyelid of the right eye, with a sensation of movement, irritation and pain. A Siemens Magnetom Essenza 1.5 tesla was used. The data were processed on a Syngo.via VB20 workstation. The study was performed in the axial, coronary and sagittal planes. In an MRI study of the orbits bilaterally, the *bulbus oculi*, the muscular apparatus and the *nervi optici* were with normal position, shape, size, outline and without pathological signal changes. In the left, the periorbital spaces were free of pathological signal changes. Periorbital and in the area of the right lower eyelid, subcutaneously, medially and with changes, more pronounced towards the lateral part and in a smaller area towards the medial part, there was an oval hypointense zone with high signal changes in T1 tse_dix and T1 vibe, with coronary dimensions

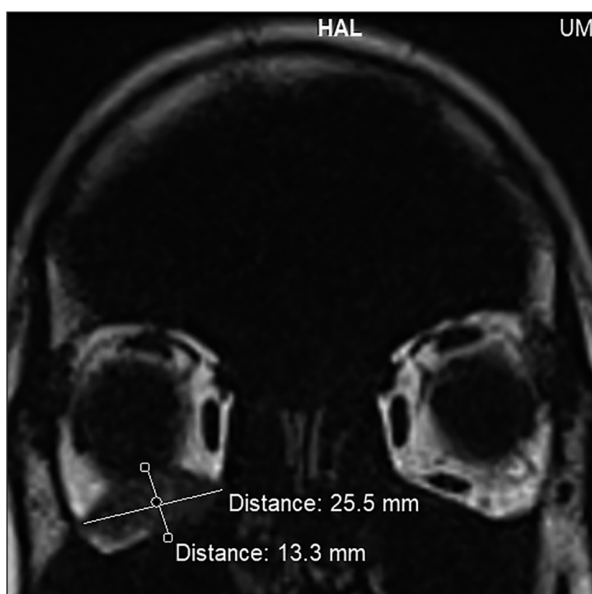


Fig. 1. T1w sequence in the coronary plane. Low signal changes in the pathological mass.

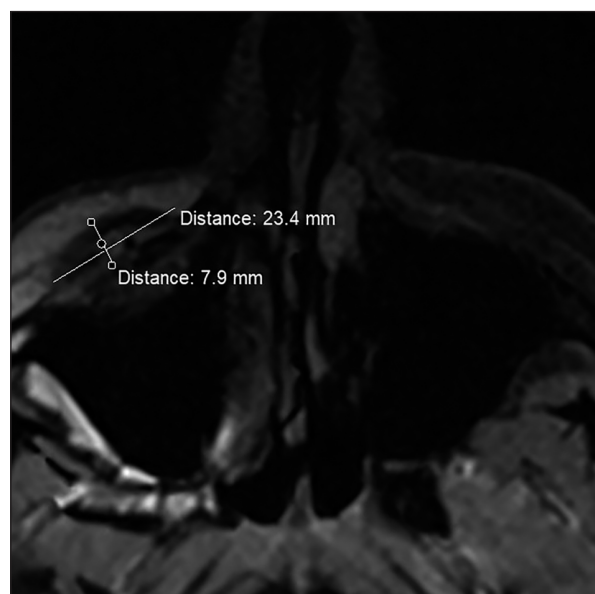


Fig. 2. T1w sequence in the axial plane. Low signal changes in the pathological mass, from the area of the lower eyelid.

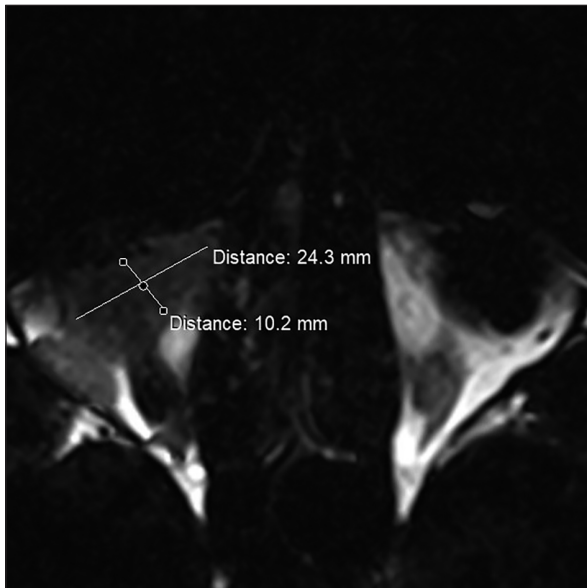


Fig. 3. T1 vibs fs low signal changes of the mass.

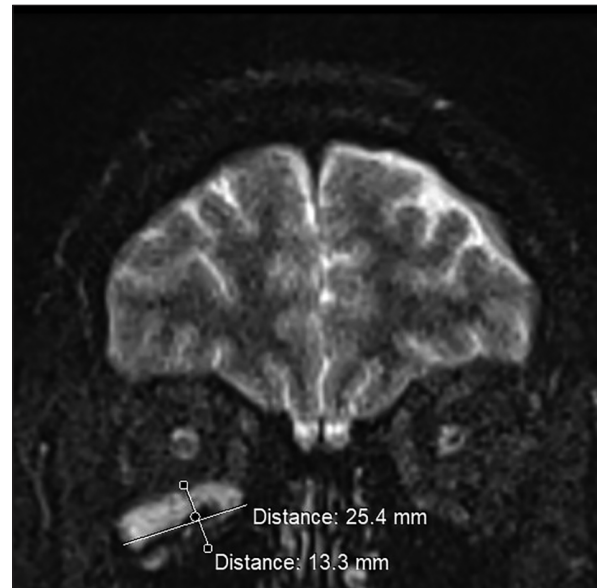


Fig. 4. T2tse_dix sequence in the coronary plane. Low signal changes centrally and high signal changes peripherally.

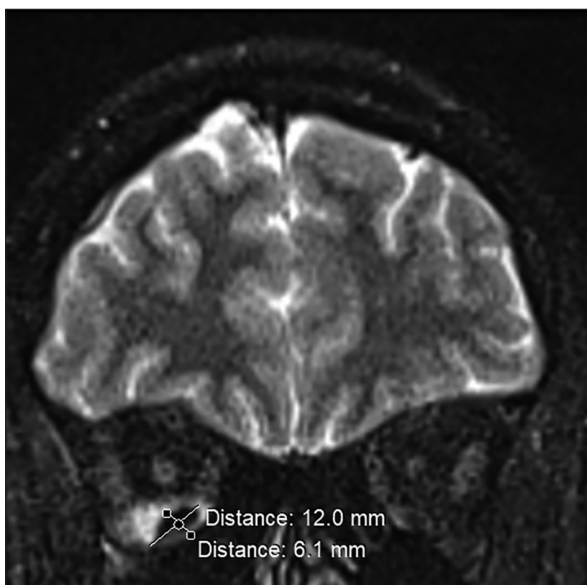


Fig. 5. T2tse_dix in the coronary plane. Low signal changes centrally and high signal changes peripherally.

up to 25.5/ 13.3 mm (Fig. 1-3). Centrally, there were low signal changes in the T2 tse_dix sequence, with the area having an irregular oval shape. It was not sharply separated from the surrounding structures. In the T2 tse_dix the tumour was hetero-intense, with dimensions in the coronary plane reaching 25.5/ 13.3 mm, its peripheral part being hyperintense and the central one being hypointense, with dimensions up to 12.0/ 6.1 mm (Fig. 4-6).

In the neighbourhood, smaller linear areas measuring up to 3.0-4.0/ 1.0 mm were also visible. An oval prominence of the described finding to the

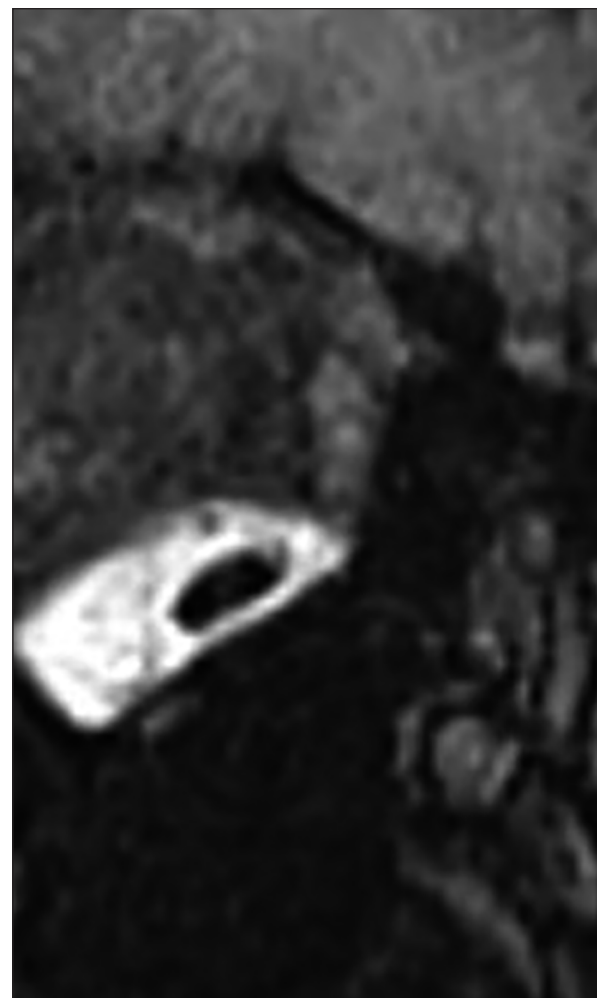


Fig. 6. T2tse_dix sequence, right orbit, in the coronary plane. Enlarged scale of the pathological finding, presenting with low signal changes centrally and high signal changes peripherally.

lower and anterior orbital space was visible. The lower eyelid was thick, with high signal changes in s T1 W sequences. High signal changes in the T2 tse_dix sequences were detected in the irregularly thickened mucosa area of the right maxillary sinus. The described finding indicated the presence of a soft tissue oval formation in the region of the lower eyelid, with pronounced perifocal swelling. The MRI showed changes that resembled a foreign body, lesions, or neoplastic process with perifocal swelling. Due to anamnestic data and pathologic changes identified after MRI, which indicated the presence of *Dirofilaria*, the patient was referred to an eye surgeon. After the parasitological studies, two immature female parasites of the species *Dirofilaria repens* Railliet & Henry 1911 (larvae; Onchocercidae; Nematoda) were identified, with the following anatomic-morphological characteristics: white-coloured nematodes 60 and 67 mm in length and 1.5 mm in width. The laboratory tests (cytological, biochemical and urine) prior to the removal of the parasites revealed abnormalities in the number of eosinophilic cells – 8% (reference values 0-6%) and in ESR 30 mm/h (reference values up to 25 mm/h). After the removal of the parasites, the clinical and laboratory parameters reached the reference values, with eosinophilic cells being 5% and ESR 18 mm/h. After venous blood testing by the Knot method, no microfilariae were detected in the stained preparations. Serological testing for antibodies to *Dirofilaria immitis* was negative. Abdominal sonography revealed no pathological findings. Six months after the parasite has been removed, the patient was feeling well, without symptoms.

DISCUSSION

Two cases of dirofilariasis have been reported in the town of Radnevo, Stara Zagora region, Bulgaria, in the last years. As a parasite in humans, in our country, only *Dirofilaria repens* has been reported^{2,6-9}. Groell et al¹⁰ reported the finding of orbital dirofilariasis after MRI in a 61-year-old woman. On T1 W MRI, the authors found that the parasite was visible as a discrete, low-intensity tubular signal in the centre of the node, surrounded by inflammatory contrast-enhancing tissue. The authors concluded that at MRI the inflammatory node embedding the parasite appeared as a thick-walled semi-fluid structure of T2-weighted images. On the T1-weighted images, the lesion was shown as a discrete, tubular, central signal that clearly represents the worm. Better results were obtained after using contrast. Eccher et al³ described a periorbital subcutaneous tumour as a lesion caused by *Dirofilaria*

repens. MRI revealed a small subcutaneous oval mass with a maximum diameter of 15 mm, located at the bottom of the right orbit. At contrast-enhanced MRI they manifested a central necrotic zone with a peripheral ring. Hrčkova et al¹ reported a fourth case of dirofilariasis in the territory of Slovakia in a 58-year-old woman, justifying the announcement of new endemic regions for the invasion. The diagnosis was confirmed with the help of computed tomography (CT) scans, histological and molecular examinations conducted for the first time in the country. CT examination revealed a discrete fibrous node with a diameter of 0.8 cm. Microscopic cross-sectional analysis of the surgically removed node and subsequent DNA analysis confirmed the presence of a single male specimen of *Dirofilaria repens*.

CONCLUSIONS

MRI is an accurate, harmless and non-invasive imaging method for diagnosis of *Dirofilaria repens* and assessment of changes in affected areas caused by the parasite and surrounding structures (retrobulbar spaces, optical muscles, *bulbus oculi*, *nervi optici*). As a result of the established signal characteristics of the parasite itself, different from those of peripheral oedema and healthy structures, it is possible to prove the parasite and establish its exact localization. The utilization of the MRI allows a correct diagnosis before surgical removal of the parasite.

Author Contributions:

M.M. and B.C. were responsible for the diagnostic procedures. B.C. was responsible for clinical diagnosis, and treatment decisions. M.M. performed MRI examination. M.M. and B.C. wrote the manuscript. All authors have read and agreed to the published version of the manuscript.

Compliance with Ethics Requirements:

„The authors declare that they do not have any financial or personal relationships that might bias the content of this work.“

„The authors certificate that the procedures and the experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2000 (5), as well as the national law. Informed consent was obtained from the patient included in the study“

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