IMAGING DIAGNOSIS USED IN GRAVES OPHTHALMOPATHY, CURRENT IMAGING PROCEDURES

SUMMARY: Imaging procedures in Graves ophthalmopathy consist mainly in computer tomography and magnetic resonance. The advantage of MRI is the possibility to distinguish between the acute inflammatory stage of the disease from the fibrotic, inactive stage of the disease. It is the best method for identifying acute inflammatory changes and evaluation of the immunomodulatory treatment by using special sequences and planar reconstruction. Computer tomography produces detailed images of the bony structures of the orbit, but it does not reveal much about the stage of the disease. It is the best method for evaluation for the orbit before planning a decompression surgery of the orbit in active disease patients.

Keywords: Graves ophthalmopathy, CT, MRI, ultrasound

DIAGNOSTICUL IMAGISTIC ÎN OFTALMOPATIA GRAVES, METODE ACTUALE DE INVESTIGAȚIE

Rezumat: Investigațiile imagistice efectuate pacienților cu Graves constau în principal în computer tomografie și rezonanță magnetică. Avantajul rezonanței magnetică constă în posibilitatea distingerii între forma inflamatorie acută și forma fibroasă, inactivă. Este cea mai bună opțiune pentru identificarea modificărilor inflamatorii acute și pentru evaluarea răspunsului la tratamentul immunomodulator, cu ajutorul secvențelor speciale și a reconstrucțiilor planare. Computer tomografia produce imagini amanunțite ale structurilor osașelor orbitale, dar nu dă detalii foarte mufte despre activitatea bolii. Este cea mai bună metodă de evaluare a orbitei înaintea planificării unei operații de decompresie a orbitei în cadrul bolii inactive.

Cuvinte cheie: oftalmopatie Graves, CT, IRM, ecografie

MATERIALS AND METHODS

Ultrasound

Ultrasound performed on patients with Graves ophthalmopathy can detect intraorbital masses, soft tissue heterogeneity, spindle-like thickening of the extraocular muscles. It’s advantages are short examination time, low price, lack of ionizing radiation, but it has big disadvantages like the impossibility of visualising the apex of the orbit and variable measurements, depending on the accuracy and the experience of the examinator. Its quality can not be compared to the CT or the MRI images(6,7).

Magnetic Resonance Imaging (MRI)

The main protocols used are T1 and T2 weighted images and TIRM (Turbo-Inversion Recovery-Magnitude), which proved very efficient not only in detecting inflammation in the extraocular muscles, but also in ruling out other pathology. Gadolinium enhances considerably the investigation. The standard protocol includes 3 mm T1 and T2 weighted images and planar reconstructions. The muscular changes consist in fusiform enlargement, but sparing of the tendons, compression to the optic nerve, intra and extraconal fat enlargement, protrusion. The advantages of MRI are: precision in measuring the protrusion of the eye in axial T1 weighted images by marking a line between the left

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and right zygomatic border—the interzygomatic lyne, from there a perpendicular line is taken to the apex of the globe. An index larger than 22 is pathological. Another advantage is the possibility to distinguish between acute inflammation and fibrotic changes, by using contrast media, acute inflammations appear on T1 weighted images as enhancements, while fibrotic changes do not enhance when given contrast media. Edematous changes are also easy to highlight with contrast media in T2 weighted images, and of course, there is no ionizing radiation. The long time for exposure is a disadvantage (about 30 minutes) along with the interdiction of MRI in patients with metallic implants. Also, the bony structures can not be evaluated precisely, and the costs are high (3, 4).

Computed tomography (CT)

Spiral CT-s 3 mm thick can be made routinely, with ulterior multiplanar reconstructions. Today CT is used as an additional method for patients with metal implants, for evaluation of the bones in planning a surgical decompression of the orbit, or for the patients that had inconclusive MRI scans. The advantages are: short time for the investigation (about 5 minutes), good appreciation of the boney structures, the possibility of scanning patients with metal implants, moderate costs. The ionizing radiation is a disadvantage, along with the poor evaluation of the disease activity and long reconstruction time (7,8).
Discussions

The treatment of severe and progressive Graves ophthalmopathy is difficult. The therapeutic conduct must always be done as an interdisciplinary collaboration (endocrinologist, radiologist, ophthalmologist). Every patient with eye protrusion must get CT or MRI scans, except the cases that are already diagnosed with Graves ophthalmopathy.

Conclusions

Both procedures (CT and MRI) are recommended to be done to patients with Graves ophthalmopathy, in order to evaluate the muscles, the optic nerve, fat, protrusion and bones, and the results can be compared. MRI images are more relevant than the CT images when the muscles, the fat, the optic nerve and especially the apex of the orbit are examined. CT produces detailed imaging of the bones. The conclusion is that MRI is a better procedure than CT when investigating Graves ophthalmopathy.

Abbreviations:

CT – Computer Tomography
MRI – Magnetic Resonance Imaging
TIRM - Turbo-Inversion Recovery-Magnitude

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