The current role of radiotherapy in “Bilateral exophthalmos in Graves’ disease”.

Styliani Stylianidou1, Anastasia Chatzigiannaki2, Periklis Bousbouras2, Spyridon Domoxoudis1, Kyriaki Pistevou-Gombaki1

1Department of Radiotherapy Oncology, Aristotle University of Thessaloniki, AHEPA University Hospital
2Department of Medical Physics, Aristotle University of Thessaloniki, AHEPA University Hospital

ABSTRACT: Bilateral exophthalmos in Graves’ disease is a rare occurrence. It is highest in patients with Thyroid ophthalmopathy. We report a case in which a bilateral malignant exophthalmos in the course of Graves Basedow disease has been irradiated at the Radiotherapy Department of the Aristotle University Hospital AHEPA of Thessaloniki.

Key Words: Exophthalmos, Graves Basedow disease, Radiotherapy.

INTRODUCTION
Exophthalmos (also called exophthalmia or proptosis) is a bulging of the eye anteriorly out of the orbit. Exophthalmos can be bilateral as is often seen in Grave’s disease. In the case of Grave’s Disease, the displacement of the eye is due to abnormal connective tissue deposition in the orbit and extra ocular muscles which can be visualized by Computed tomography (CT) or Magnetic resonance imaging (MRI). If left untreated, exophthalmos can cause the eyelids to fail to close during sleep leading to corneal dryness and damage. Another possible complication would be a form of redness or irritation, called “superior limbic keratoconjunctivitis”, where the area above the cornea becomes inflamed as a result of increased friction when blinking. The process that is causing the displacement of the eye may also compress the optic nerve or ophthalmic artery, leading to blindness.

CASE REPORT
A 61- year-old man with significant bilateral exophthalmos (of the right eye was more well-defined) was presented to our department. The patient had ophthalmic symptoms involving periorbital soft tissues, eyelids, oculomotor muscles and even optic nerves. He was with decreased movement range of eyeballs, (+) in creased exophthalmos, diplopia and lacrimation(+), (+) eyeball pain. He was treated for 45 days after diagnosis (December 2007) with corticosteroid per os (medrol 24 mg/day) from endocrinologist. As there was no big improvement of the symptoms, he came to our Radiotherapy department for irradiation. Diagnosis of ophthalmopathy is mainly based on clinical data. The aim of ophthalmological examination is to assess the state of eyelids, conjunctivas, exophthalmos, oculo-motor muscle disfunction, cornea and visual acuity. Ambulatory irradiation of retro bulbar areas was performed in the Radiotherapy Department in University Hospital AHEPA. Before the treatment initiation, an individual plexiglass mask was created for the patient which allowed the limits of irradiation fields to be reconstructed. CT simulation-examination was performed for therapy planning purposes. Irradiation technique was based on exposing the retrobulbar area to the effect of two opposite, isocentric beams which would create one, common (flat) line from the lens direction. Dimensions of the irradiation field were within the limits of 4 cm x 5 cm (Figure 1, 2).

Corresponding author: Stylianidou Styliani, Aristotle University of Thessaloniki, Department of Radiotherapy Oncology, AHEPA University Hospital, St. Kyriakidi 1, 546 36 Thessaloniki Greece, Tel. +30 2310 993421, +30 6941 677422, e-mail: stell_star@yahoo.gr
Planned dosage of radiation was 20Gy applied in 12Fr. The 1st dose fraction was 1 Gy and 1,73Gy/Fr during the following 11 days (5 days a week). Control of treatment quality was performed by comparing portal images (created on the day the irradiation started) to Images from the treatment planning system. At the end of the irradiation treatment, the therapy was considered to be successful: increased movement range of eyeballs, decreased exophthalmos, decrease of diplopia and lacrimation, reduction of eyeball pain. The MRI in the orbit after three months of irradiation showed decrease thickening of straight muscles.

**DISCUSSION**

Radiotherapy has been for many years one of the methods used in treatment of ophthalmopathy occurring in the course of Graves-Basedow disease. It is significant that ophthalmopathy irradiation is accompanied by few side effects. The disease is a result of an autoimmunological process. Activated suppressor T-lymphocytes infiltrate the muscles moving the eyeball which leads to their thickening. Patients with infiltrative ophthalmopathy in the course of Graves-Basedow disease are qualified in our centre for irradiation treatment according to the following criteria: 1) euthyreosis assessed on the basis of TSH, T3, T4, FT4 levels. 2) qualification for therapy by a consulting ophthalmologist. 3) Thickening of straight muscles in both orbits, damaged optic nerve and enlargement of the lacrimal gland as showed by CT (computed tomography) or MRI (magnetic resonance) of orbital regions, is performed to find the cause of ophthalmic symptoms. 4) Patient’s consent to proposed treatment. The aim of radiotherapy in the course of Graves Basedow disease is to eliminate radiosensitive lymphocytic infiltrations of eyeball muscles and fibroblasts while preserving normal functions and anatomical structures localized inside the orbital cavity. Planned dosage of radiation was 20Gy applied in 12Fr. So the 1st fraction dose was 1 Gy and 1,73Gy/Fr during the following 11 days (5 days a week). Corticosteroids and irradiation of retrobulbar areas are still important elements of treatment blocking local inflammatory reaction and stabilizing the disease process. These methods lead to a reduction of existing symptoms in only 40%-70%. In our case, there was not side effects after radiation therapy (lacrimation and swelling of the eyelids, slight skin erythema), while the patient presented regression of the diplopia and improved visual activity.

**CONCLUSIONS**

In conclusion, the value of radiation therapy was investigated in this patient with Graves’ ophthalmopathy treated with orbital irradiation at the Radiotherapy Department of AHEPA University Hospital, Aristotle University of Thessaloniki. Irradiation was administered with two opposed convergent beams tilted posteriorly 5-10 degrees with 20Gy/12Fr/2 weeks. The follow up consisted of endocrinologist and ophthalmologic tests and of post irradiation orbital MRI. We point out that a combination of glucocorticosteroids with concurrent irradiation is the best form of ophthalmopathy treatment, in bilateral exophthalmos, in the course of Graves-Basedow disease.
Ο θεραπευτικός ρόλος της ακτινοθεραπείας στον «αμφοτέροπλευρο εξώφθαλμο στη νόσο του Grave’s».

Στυλιανή Στυλιανίδου, Αναστασία Χατζηγιαννάκη, Περικλής Μπούσμπουρας, Κυριακή-Πιστεύου-Γομπάκη

1Τμήμα Ακτινοθεραπευτικής Υγιεινής, Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, Πανεπιστημιακό Γενικό Νοσοκομείο ΑΧΕΠΑ, Θεσσαλονίκη
2Τμήμα Ιατρικής Φυσικής, Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, Πανεπιστημιακό Γενικό Νοσοκομείο ΑΧΕΠΑ, Θεσσαλονίκη

ΠΕΡΙΛΗΨΗ: Ο αμφοτέροπλευρο εξώφθαλμος στο νόσο του Grave’s εμφανίζεται σπάνια. Είναι συχνότερος σε ασθενείς με θυρεοειδή οφθαλμοπάθεια. Αναφέρουμε μια περίπτωση αμφοτέροπλευρο εξώφθαλμου οφείλομενο στη νόσο Grave’s Basedow, που έχει ακτινοβοληθεί στο τμήμα Ακτινοθεραπευτικής Υγιεινής στο Πανεπιστημιακό Γενικό Νοσοκομείο ΑΧΕΠΑ του Αριστοτελείου Πανεπιστήμιο της Θεσσαλονίκης.

Λέξεις Κλειδιά: Εξώφθαλμος, Νόσος του Grave’s-Basedow, Ακτινοθεραπεία.

REFERENCES