



Benefit of surgery in presence of orbital metastasis

This is the peer reviewed version of the following article:

Original:

Ulivieri, S., Toninelli, S., Giorgio, A., Fruschelli, M., Toti, P., Miracco, C., et al. (2013). Benefit of surgery in presence of orbital metastasis. BULLETIN DE LA SOCIÉTÉ BELGE D'OPHTALMOLOGIE(322), 43-47.

Availability:

This version is available <http://hdl.handle.net/11365/43120> since 2022-10-19T10:30:09Z

Terms of use:

Open Access

The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. Works made available under a Creative Commons license can be used according to the terms and conditions of said license.

For all terms of use and more information see the publisher's website.

(Article begins on next page)

Bulletin of the Belgian Societies of Ophthalmology

Benefit of surgery in presence of orbital metastasis

--Manuscript Draft--

Manuscript Number:	BSBO-D-12-00013R1
Full Title:	Benefit of surgery in presence of orbital metastasis
Article Type:	Original Article
Keywords:	metastasis; orbit; small cell lung carcinoma; surgery
Corresponding Author:	Simone Ulivieri Santa Maria alle Scotte Hospital Siena, ITALY
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	Santa Maria alle Scotte Hospital
Corresponding Author's Secondary Institution:	
First Author:	Simone Ulivieri
First Author Secondary Information:	
Order of Authors:	Simone Ulivieri Stefano Toninelli Antonio Giorgio Mario Fruschelli Paolo Toti Clelia Miracco Giuseppe Oliveri
Order of Authors Secondary Information:	
Abstract:	<p>Purpose: Malignant tumors metastatic to the orbit are rare and only about 5% of orbital tumors are metastasis. We report on orbital surgery in a patient with orbital metastasis from small cell lung carcinoma (SCLC).</p> <p>Methods: A 75-year-old man complained of pain in the left orbital region and proptosis. Head CT scan showed a left retrobulbar mass compressing the optical nerve. Chest and body CT scans showed a round-shaped mass at the apex of the left inferior lobule of the lung and widespread nodal involvement.</p> <p>Results: A surgical intervention on the left orbit through a lateral approach was performed, with complete removal of the mass. Histology showed features of a non-anaplastic SCLC. A complete restoration of visual acuity was obtained</p> <p>Conclusions: A debulking orbital surgery, in order to relieve optic nerve compression, should be offered to the patients with orbital metastasis.</p>

Benefit of surgery in presence of orbital metastasis

Simone Ulivieri¹, MD, Stefano Toninelli², MD, Antonio Giorgio³, MD, Mario Fruschelli⁴, MD, Paolo Toti⁵, MD, Clelia Miracco⁵, MD, Giuseppe Oliveri¹, MD

¹Department of Neurosurgery, “Santa Maria alle Scotte” Hospital, Siena, Italy;

²Department of Neurosurgery, “Moriggia-Pelascini” Hospital, Gravedona (CO),

Italy; ³Department of Neurological and Behavioral Sciences, University of

Siena, Italy; ⁴Department of Ophthalmology, “Santa Maria alle Scotte”

Hospital, Siena, Italy; ⁵Department of Human Pathology and Oncology,

University of Siena, “Santa Maria alle Scotte” Hospital, Siena, Italy

Corresponding author:

Dr. Simone Ulivieri,

Dept. of Neurosurgery,

Policlinico “Santa Maria alle Scotte”

Viale Bracci 2, 53100 Siena, Italy

Email: simone.ulivieri@email.it

None of the authors has conflict of interest with the submission.

No financial support was received for this submission

Abstract

Purpose: Malignant tumors metastatic to the orbit are rare and only about 5% of orbital tumors are metastasis. We report on orbital surgery in a patient with orbital metastasis from small cell lung carcinoma (SCLC).

Methods: A 75-year-old man complained of pain in the left orbital region and proptosis. Head CT scan showed a left retrobulbar mass compressing the optical nerve. Chest and body CT scans showed a round-shaped mass at the apex of the left inferior lobule of the lung and widespread nodal involvement.

Results: A surgical intervention on the left orbit through a lateral approach was performed, with complete removal of the mass. Histology showed features of a non-anaplastic SCLC. A complete restoration of visual acuity was obtained

Conclusions: A debulking orbital surgery, in order to relieve optic nerve compression, should be offered to the patients with orbital metastasis

Keywords: metastasis; orbit; small cell lung carcinoma; surgery

Introduction

Malignant tumors metastatic to the orbit are rare and only about 5% of orbital tumors are metastases (1). The most common metastatic malignancies are breast, lung and prostate (1). In 10-30% of cases, the onset of ocular/orbital symptoms predates the detection of the primary tumor, especially in case of lung and kidney tumors (1). However, in ~10% of the cases, the primary site remains unknown despite thorough examination (1). The small cell lung carcinoma (SCLC) is one of the most aggressive metastatic tumors and common sites of metastasis include bone, liver, lymph nodes, the central nervous system, adrenal gland, subcutaneous tissue and pleura (2). We report here on a case of SCLC with orbital metastasis (OM) as first presenting manifestation. We will also discuss treatment decisions in light of other studies.

Case report

A 75-year-old man came to the Emergency Department of our Hospital because of pain in the left orbital region and proptosis. He has complained over the past 3 months of a progressive reduction in visual acuity (VA) and weight loss (about 12 kilograms). He was a heavy smoker (about 25 cigarettes/day). A head CT scan showed left retrobulbar mass compressing the optical nerve (ON) (Figure 1A, arrow). A chest CT scan showed a round-shaped solid mass (diameter of ~20 mm) at the apex of the left inferior lobule of the lung (Figure 2). A total-body contrast-enhanced CT scan confirmed the presence of a mass suggestive of a primary adenocarcinoma of the lung, with widespread involvement of lymphnodes of the lung hylum, meadiastinum, supraclavear and lower neck regions. The chest surgeon, in light of the

radiologic picture, decided not to perform intervention.

A decrease of VA in the left eye (vision of 6/10) was recorded. No abnormalities of oculomotion and visual field were present. Ophthalmoscopy revealed disc swelling, “flame hemorrhages”, twisting and edematous vessels on the left and arteriolar narrowing on the right. Fluorescein angiography (Figure 3) was also performed, showing epipapillary teleangiectasia, peripapillary “flame hemorrhages” and late fluorescence (diffusion) in the optic disc.

Despite total body CT scan showed an advanced thoracic spread of the disease and thoracic surgeon ruled out surgery, we decided to operate the patient in order to preserve VA and to make a histologic diagnosis.

One week after the admission, we performed a surgical intervention on the left orbit through a lateral approach (Kronlein). In particular, after bending the lateral rectus muscle superiorly, the tumor was progressively debulked and removed, paying attention to preserve the integrity of the optic nerve, which was compressed but not infiltrated by the tumor.

The complete removal of the mass was documented by a head CT scan (Figure 1B). Histologic report (Figure 4) showed infiltration of the connective and muscular tissues of the orbit due to the presence of a poorly differentiated and partially necrotic carcinoma with a high proliferative index. Morphological and immunophenotype features were suggestive of a non-anaplastic SCLC. Post-operative course was uneventful and a complete restoration of VA was obtained and confirmed on a follow-up visit 30 days post-surgery. The oncologist suggested also treatment with chemo- and radiotherapy, which will be soon performed in a different medical Institution, because the patient will

move to a different city. Unfortunately, after discharge from our Hospital the patient was not contactable and thus we could not assess his clinical status after treatment with chemo- and radiotherapy.

Discussion

No other cases of SCLC with OM and ON compression and considered eligible for orbital surgery are known. Instead, there are some cases similar to our patient, but treated differently. In 3 cases (3,4,5) with impairment of VA by compression or stretching of the ON, the tumor (histologically SCLC) extended outside the orbit on the surface of the skull and response to chemo- and/or radiotherapy was highly variable. Zarogoudilis & al. described a patient with OM from lung adenocarcinoma and visual impairment due to ON compression treated with chemo- and radiotherapy to the orbital mass, without improvement of VA (6). Char & al. presented a series of 31 patients with OM (1). They used tumor debulking in patients with primary orbital tumor; in patients refusing needle biopsy; in those cases with solitary OM; and in patients with decreased VA from ON compression. Only in the last setting the authors obtained good temporary results.

The prognosis in patients with SCLC is dismal. Estimated median survival time is 10 months (7) whereas in patients with OM is between 10 and 20 months (1). After a correct diagnosis, the choice of treatment is based on the systemic status of the patient and on the possible presence of ON compression (1). The goal of treatment should focus on preservation and restoration of VA as soon as possible. Since these patients have a limited survival time, the preservation of VA has an important impact on the quality of life. Despite the reported cases of VA recovery after several weeks of radio-

and/or chemotherapy (3,4), such a good response is somehow unpredictable (5,6). In our opinion, a debulking orbital surgery that relieves ON compression should be offered to the patient whenever is possible.

References

1. Char DH, Miller T, Kroll S: Orbital metastases: Diagnosis and course. *Br J Ophthalmol* 1997; 81:386-390
2. Sher T, Dy GK, Adjei AA: Small cell lung cancer. *Mayo Clin Proc* 2008; 83:355-367
3. Spaide RF, Granger E, Hammer BD, Negrón FJ, Paglen PG: Rapidly expanding exophthalmos: An unusual presentation of small cell lung cancer. *Br J Ophthalmol* 1989; 73:461-462
4. Mena AM, Pardo J: Orbital metastasis as the initial manifestation of small cell lung cancer. *Acta Ophthalmol Scand* 2002; 80:113-115
5. Henning M, Hu Q, Siegelmann-Danieli N: Orbital metastasis as the presenting symptom of extensive stage small cell lung cancer. *Eur J Intern Med* 2008; 19:65-66
6. Zarogoulidis P, Terzi E, Kouliatsis G, et al.: Orbital metastases as the first manifestation of lung adenocarcinoma. *Case Report Ophthalmol* 2011; 2:34-38
7. Paesmans M, Sculier JP, Lecomte J, et al.: Prognostic factors for patients with small cell lung carcinoma: Analysis of a series of 763 patients included in 4 consecutive prospective trials with a minimum follow-up of 5 years. *Cancer* 2000; 89:523-533

Figure legends

Figure 1. Axial CT scan of the head shows left retrobulbar mass (arrow in A) and no residual mass after operation (B)

Figure 2. Chest CT scan showing a solid round-shaped abnormality with a diameter of about 20 mm at the apex of the left inferior lobule of the lung

Figure 3. Fluorescein angiography. See text for details

Figure 4. Metastatic deposit of lung cancer (A) showing a positive nuclear staining of Thyroid Transcription Factor-1 (B). A, Hematoxylin and eosin; original magnification x 200. B, Immunohistochemistry, Avidin-Biotin method; original magnification, x 400

Benefit of surgery in presence of orbital metastasis

Simone Ulivieri¹, MD, Stefano Toninelli², MD, Antonio Giorgio³, MD, Mario Fruschelli⁴, MD, Paolo Toti⁵, MD, Clelia Miracco⁵, MD, Giuseppe Oliveri¹, MD

¹Department of Neurosurgery, “Santa Maria alle Scotte” Hospital, Siena, Italy;

²Department of Neurosurgery, “Moriggia-Pelascini” Hospital, Gravedona (CO),

Italy; ³Department of Neurological and Behavioral Sciences, University of

Siena, Italy; ⁴Department of Ophthalmology, “Santa Maria alle Scotte”

Hospital, Siena, Italy; ⁵Department of Human Pathology and Oncology,

University of Siena, “Santa Maria alle Scotte” Hospital, Siena, Italy

Corresponding author:

Dr. Simone Ulivieri,

Dept. of Neurosurgery,

Policlinico “Santa Maria alle Scotte”

Viale Bracci 2, 53100 Siena, Italy

Email: simone.ulivieri@email.it

None of the authors has conflict of interest with the submission.

No financial support was received for this submission

Abstract

Purpose: Malignant tumors metastatic to the orbit are rare and only about 5% of orbital tumors are metastasis. We report on orbital surgery in a patient with orbital metastasis from small cell lung carcinoma (SCLC).

Methods: A 75-year-old man complained of pain in the left orbital region and proptosis. Head CT scan showed a left retrobulbar mass compressing the optical nerve. Chest and body CT scans showed a round-shaped mass at the apex of the left inferior lobule of the lung and widespread nodal involvement.

Results: A surgical intervention on the left orbit through a lateral approach was performed, with complete removal of the mass. Histology showed features of a non-anaplastic SCLC. A complete restoration of visual acuity was obtained

Conclusions: A debulking orbital surgery, in order to relieve optic nerve compression, should be offered to the patients with orbital metastasis

Keywords: metastasis; orbit; small cell lung carcinoma; surgery

Introduction

Malignant tumors metastatic to the orbit are rare and only about 5% of orbital tumors are metastases (1). The most common metastatic malignancies are breast, lung and prostate (1). In 10-30% of cases, the onset of ocular/orbital symptoms predates the detection of the primary tumor, especially in case of lung and kidney tumors (1). However, in ~10% of the cases, the primary site remains unknown despite thorough examination (1). The small cell lung carcinoma (SCLC) is one of the most aggressive metastatic tumors and common sites of metastasis include bone, liver, lymph nodes, the central nervous system, adrenal gland, subcutaneous tissue and pleura (2). We report here on a case of SCLC with orbital metastasis (OM) as first presenting manifestation. We will also discuss treatment decisions in light of other studies.

Case report

A 75-year-old man came to the Emergency Department of our Hospital because of pain in the left orbital region and proptosis. He has complained over the past 3 months of a progressive reduction in visual acuity (VA) and weight loss (about 12 kilograms). He was a heavy smoker (about 25 cigarettes/day). A head CT scan showed left retrobulbar mass compressing the optical nerve (ON) (Figure 1A, arrow). A chest CT scan showed a round-shaped solid mass (diameter of ~20 mm) at the apex of the left inferior lobule of the lung (Figure 2). A total-body contrast-enhanced CT scan confirmed the presence of a mass suggestive of a primary adenocarcinoma of the lung, with widespread involvement of lymphnodes of the lung hylum, meadiastinum, supraclavear and lower neck regions. The chest surgeon, in light of the

radiologic picture, decided not to perform intervention.

A decrease of VA in the left eye (vision of 6/10) was recorded. No abnormalities of oculomotion and visual field were present. Ophthalmoscopy revealed disc swelling, “flame hemorrhages”, twisting and edematous vessels on the left and arteriolar narrowing on the right. Fluorescein angiography (Figure 3) was also performed, showing epipapillary teleangiectasia, peripapillary “flame hemorrhages” and late fluorescence (diffusion) in the optic disc.

Despite total body CT scan showed an advanced thoracic spread of the disease and thoracic surgeon ruled out surgery, we decided to operate the patient in order to preserve VA and to make a histologic diagnosis.

One week after the admission, we performed a surgical intervention on the left orbit through a lateral approach (Kronlein). In particular, after bending the lateral rectus muscle superiorly, the tumor was progressively debulked and removed, paying attention to preserve the integrity of the optic nerve, which was compressed but not infiltrated by the tumor.

The complete removal of the mass was documented by a head CT scan (Figure 1B). Histologic report (Figure 4) showed infiltration of the connective and muscular tissues of the orbit due to the presence of a poorly differentiated and partially necrotic carcinoma with a high proliferative index. Morphological and immunophenotype features were suggestive of a non-anaplastic SCLC. Post-operative course was uneventful and a complete restoration of VA was obtained and confirmed on a follow-up visit 30 days post-surgery. The oncologist suggested also treatment with chemo- and radiotherapy, which will be soon performed in a different medical Institution, because the patient will

move to a different city. Unfortunately, after discharge from our Hospital the patient was not contactable and thus we could not assess his clinical status after treatment with chemo- and radiotherapy.

Discussion

No other cases of SCLC with OM and ON compression and considered eligible for orbital surgery are known. Instead, there are some cases similar to our patient, but treated differently. In 3 cases (3,4,5) with impairment of VA by compression or stretching of the ON, the tumor (histologically SCLC) extended outside the orbit on the surface of the skull and response to chemo- and/or radiotherapy was highly variable. Zarogoudilis & al. described a patient with OM from lung adenocarcinoma and visual impairment due to ON compression treated with chemo- and radiotherapy to the orbital mass, without improvement of VA (6). Char & al. presented a series of 31 patients with OM (1). They used tumor debulking in patients with primary orbital tumor; in patients refusing needle biopsy; in those cases with solitary OM; and in patients with decreased VA from ON compression. Only in the last setting the authors obtained good temporary results.

The prognosis in patients with SCLC is dismal. Estimated median survival time is 10 months (7) whereas in patients with OM is between 10 and 20 months (1). After a correct diagnosis, the choice of treatment is based on the systemic status of the patient and on the possible presence of ON compression (1). The goal of treatment should focus on preservation and restoration of VA as soon as possible. Since these patients have a limited survival time, the preservation of VA has an important impact on the quality of life. Despite the reported cases of VA recovery after several weeks of radio-

and/or chemotherapy (3,4), such a good response is somehow unpredictable (5,6). In our opinion, a debulking orbital surgery that relieves ON compression should be offered to the patient whenever is possible.

References

1. Char DH, Miller T, Kroll S: Orbital metastases: Diagnosis and course. *Br J Ophthalmol* 1997; 81:386-390
2. Sher T, Dy GK, Adjei AA: Small cell lung cancer. *Mayo Clin Proc* 2008; 83:355-367
3. Spaide RF, Granger E, Hammer BD, Negrón FJ, Paglen PG: Rapidly expanding exophthalmos: An unusual presentation of small cell lung cancer. *Br J Ophthalmol* 1989; 73:461-462
4. Mena AM, Pardo J: Orbital metastasis as the initial manifestation of small cell lung cancer. *Acta Ophthalmol Scand* 2002; 80:113-115
5. Henning M, Hu Q, Siegelmann-Danieli N: Orbital metastasis as the presenting symptom of extensive stage small cell lung cancer. *Eur J Intern Med* 2008; 19:65-66
6. Zarogoulidis P, Terzi E, Kouliatsis G, et al.: Orbital metastases as the first manifestation of lung adenocarcinoma. *Case Report Ophthalmol* 2011; 2:34-38
7. Paesmans M, Sculier JP, Lecomte J, et al.: Prognostic factors for patients with small cell lung carcinoma: Analysis of a series of 763 patients included in 4 consecutive prospective trials with a minimum follow-up of 5 years. *Cancer* 2000; 89:523-533

Figure legends

Figure 1. Axial CT scan of the head shows left retrobulbar mass (arrow in A) and no residual mass after operation (B)

Figure 2. Chest CT scan showing a solid round-shaped abnormality with a diameter of about 20 mm at the apex of the left inferior lobule of the lung

Figure 3. Fluorescein angiography. See text for details

Figure 4. Metastatic deposit of lung cancer (A) showing a positive nuclear staining of Thyroid Transcription Factor-1 (B). A, Hematoxylin and eosin; original magnification x 200. B, Immunohistochemistry, Avidin-Biotin method; original magnification, x 400

Response to reviewers

Ref.: Ms. No. BSBO-D-12-00013

Metastatic orbital localization of small cell lung carcinoma

Please note that edits to manuscript are highlighted in yellow

Reviewer #1

The content :

1. The paper is about a case report of compressive neuropathy due to orbital metastasis and which benefited from surgical excision.

This is a valuable observation, since it highlights the importance of offering the best possible care even in presence of overt metastatic disease, and this despite the unpredictability of the results.

We thank the reviewer for his/her appreciation

2. Their conclusion that whenever adapted to the situation, surgery "should be offered" to the patient is sound. However it does not correspond to the meaning of the conclusion of the abstract, which states that such surgery "should be performed". In this respect, the formulation of the abstract has to be adapted accordingly.

Done

3. The title of the paper does not describe well its main interest, which is about the possible benefit of orbital metastasis debulking in selected cases.

According to reviewer suggestion, we have changed the manuscript title as follows: "Benefit of surgery in presence of orbital metastasis"

4. The authors are submitting their report before the treatment has been completed. In the discussion section they are discussing the aspect of the survival time. They have to explain why they opted not to wait for a longer follow-up.

We have added the following sentence at the end of the case report to explain this: "Unfortunately, after discharge from our Hospital the patient was not contactable and thus we could not assess his clinical status after treatment with chemo- and radiotherapy"

The format :

1. The paper is about a case report. The statement of the authors that : "The study was performed with informed consent and following all the guidelines for experimental investigations required by the Institutional Review Board or Ethics Committee of which all authors are affiliated" is equivocal, since it is not a study. Conversely, in case the authors claim that the surgery offered to the patient was actually investigational, they would have to lay down the protocol of the study. Also, an observational case report should not be laid down with "Material, methods and results" paragraph title.

We agree with reviewer and have made the changes he/she suggested

2. The claim of the beneficial effect of the surgery is based solely on the evaluation of the visual acuity pre-op and post-op. In presence of such orbital pathology, at least visual fields are required to correctly characterize the optic neuropathy. It seems also likely that ocular motility disturbance was present.

In our case, no abnormalities of oculomotion and visual field were present. In this respect, we have added a sentence to the Case report. Moreover, we present a more detailed picture of the ophtalmoscopic examination and also findings from fluoresceine angiography.

3. The CT scanner images provided are scant if not poor. The post-operative view in the sagittal plane is not informative, instead the same plane as in the pre-op view should have been used.

In the revised version of the manuscript, we have changed the sagittal view with the axial view of the CT scan, as suggested by the reviewer

4. In the same register, considering the large size and intraconal location of the tumor, a more detailed operative description would have improved the case report.

We have provided a more detailed description of the operation, as suggested by the reviewer

5. A few minor typos have been corrected and highlighted in yellow.

Done

Reviewer #2

1. The sagittal orbital scan as figure 3 does not inform the reader about the success of the surgical procedure particularly after a so short follow-up. Will the patient have adjuvant orbital radiotherapy?

In the revised version of the manuscript, we have changed the sagittal view with the axial view of the CT scan, as also suggested by reviewer 1. The patient has moved to a different city and, as we have added, “unfortunately, after discharge from our Hospital the patient was not contactable and thus we could not assess his clinical status after treatment with chemo- and radiotherapy”.

2. It would be interesting if some histopathological images were included in the article.

Done

3. Some spelling errors for example: page 3 sigarette !

Done

Figure 1
[Click here to download high resolution image](#)

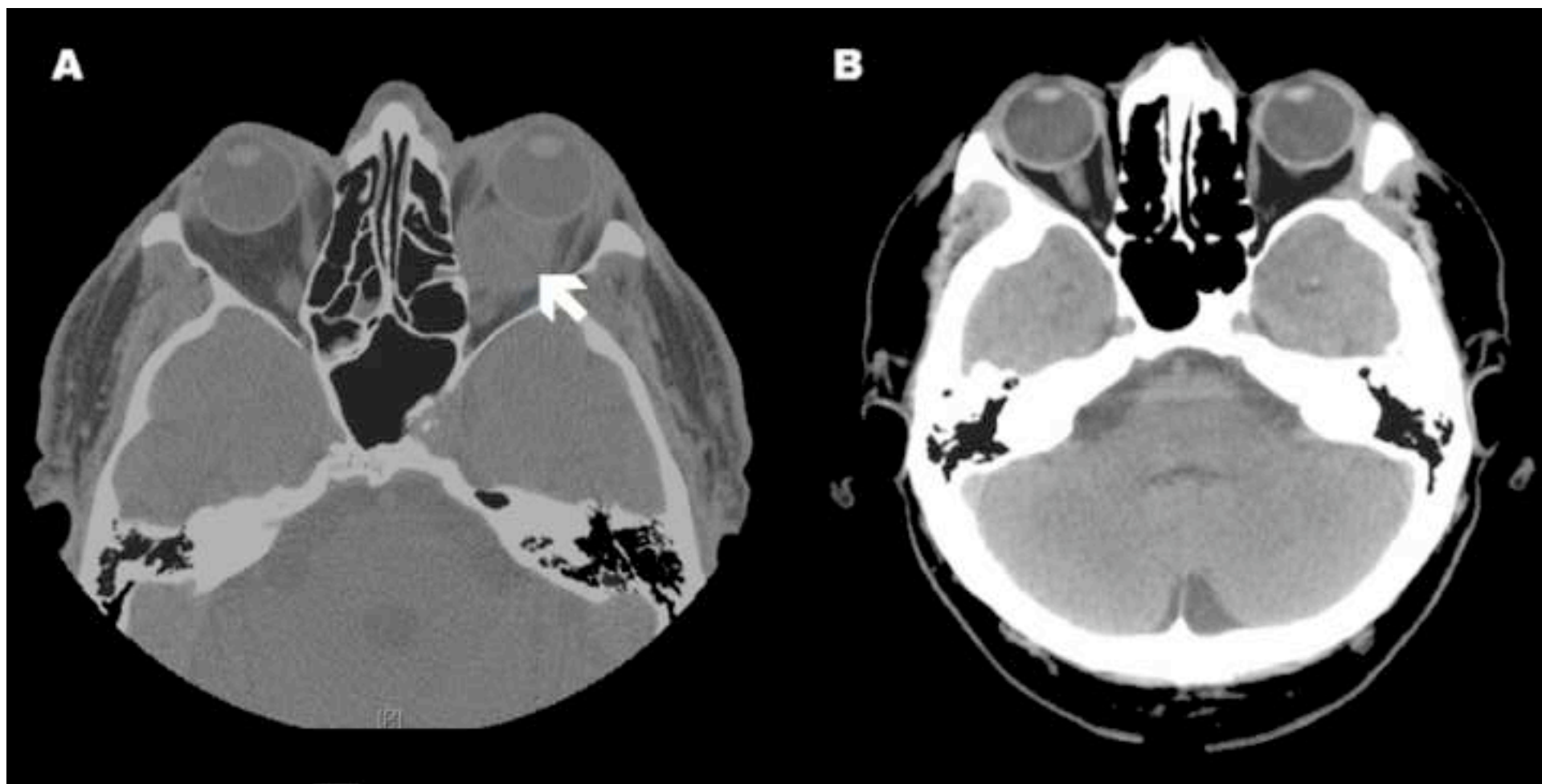


Figure2
[Click here to download high resolution image](#)

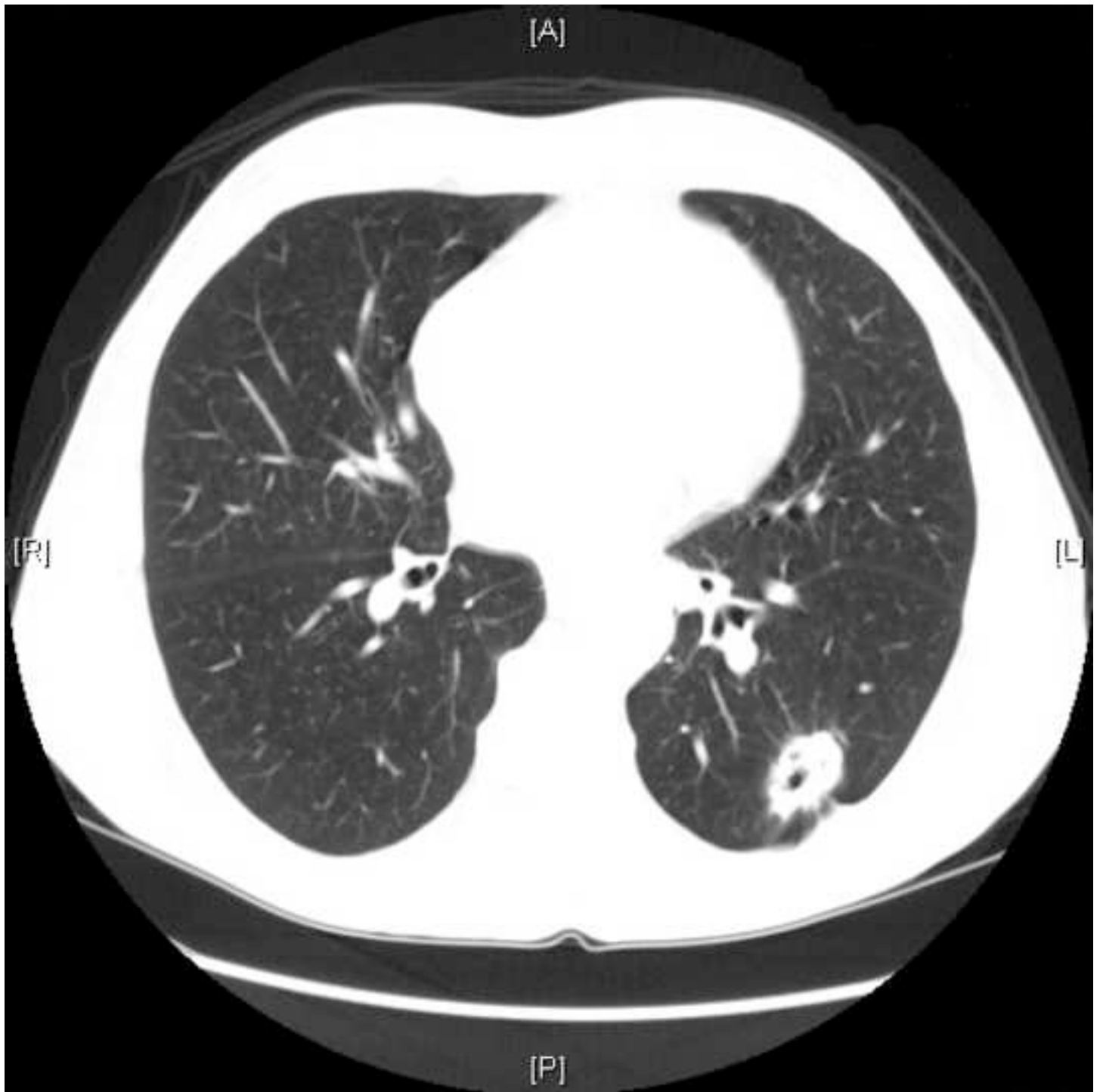


Figure3
[Click here to download high resolution image](#)

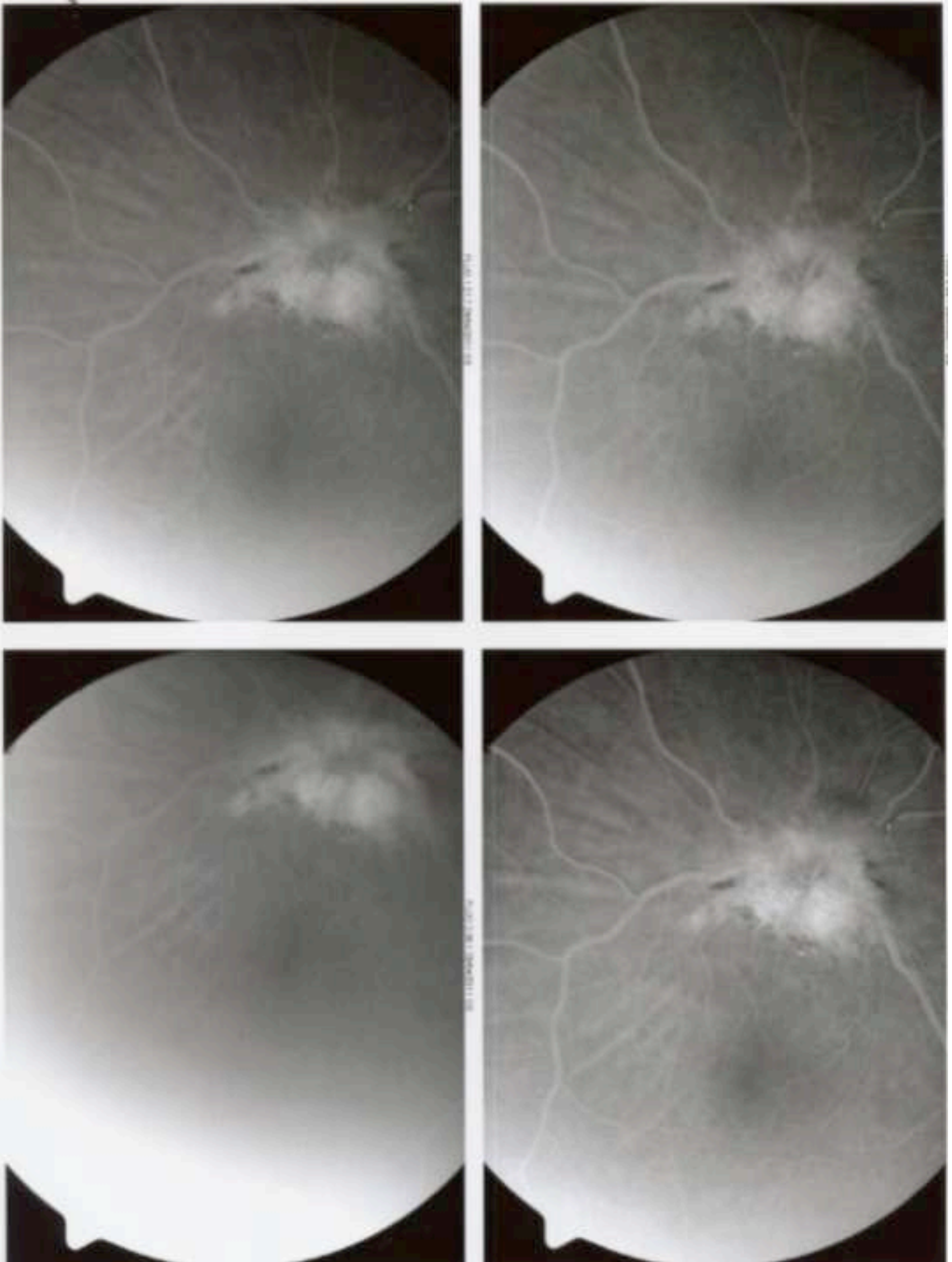


Figure4
[Click here to download high resolution image](#)

