Club de Médecine Interne et Oeil

Orbitopathies Inflammatoires

Quelles explorations proposées?

Sébastien Abad

Service de Médecine Interne. Hôpital Avicenne. Bobigny

HÔPITAL AVICENNE

Hôpitaux Universitaires Avicenne Jean-Verdier René-Muret Paris-Seine Saint-Denis

UNIVERSITÉ PARIS 13

USPC Université Sorbonne Paris Cité

Li2P Physiopathologie, cibles et Thérapies de la Polyarthrite rhumatoïde UMR 1125

Club de Médecine Interne et Oeil

Orbitopathies Inflammatoires

Quelles explorations proposées?

Sébastien Abad

Service de Médecine Interne. Hôpital Avicenne. Bobigny

HÔPITAL AVICENNE

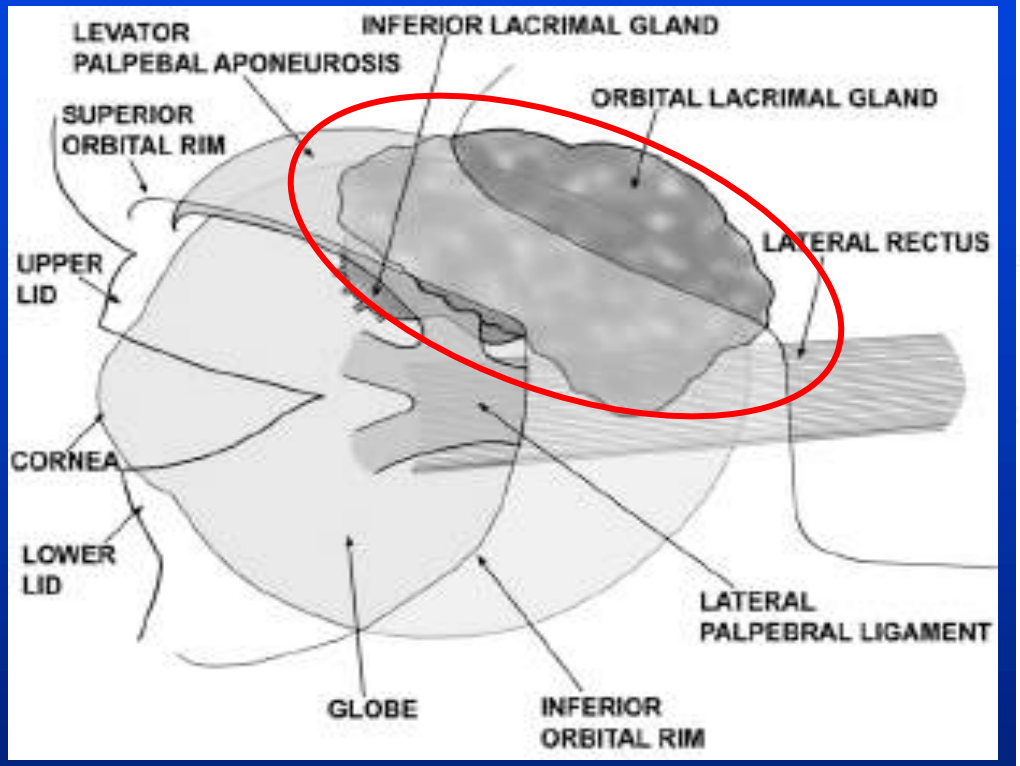
Hôpitaux Universitaires Avicenne Jean-Verdier René-Muret Paris-Seine Saint-Denis

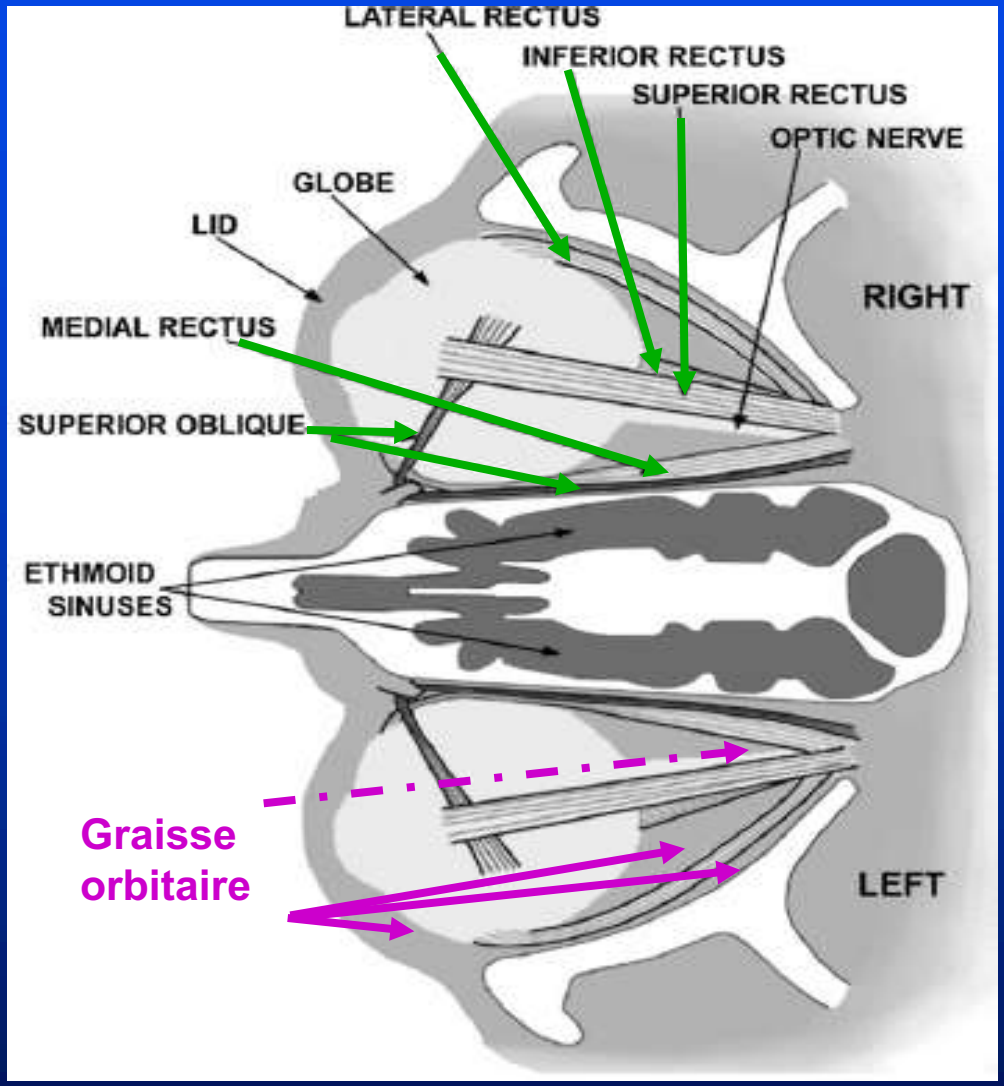
UNIVERSITÉ PARIS 13

USPC Université Sorbonne Paris Cité

Li2P Physiopathologie, cibles et Thérapies de la Polyarthrite rhumatoïde UMR 1125

Formes Anatomocliniques





Survey of 1264 Patients with Orbital Tumors and Simulating Lesions

The 2002 Montgomery Lecture, Part 1

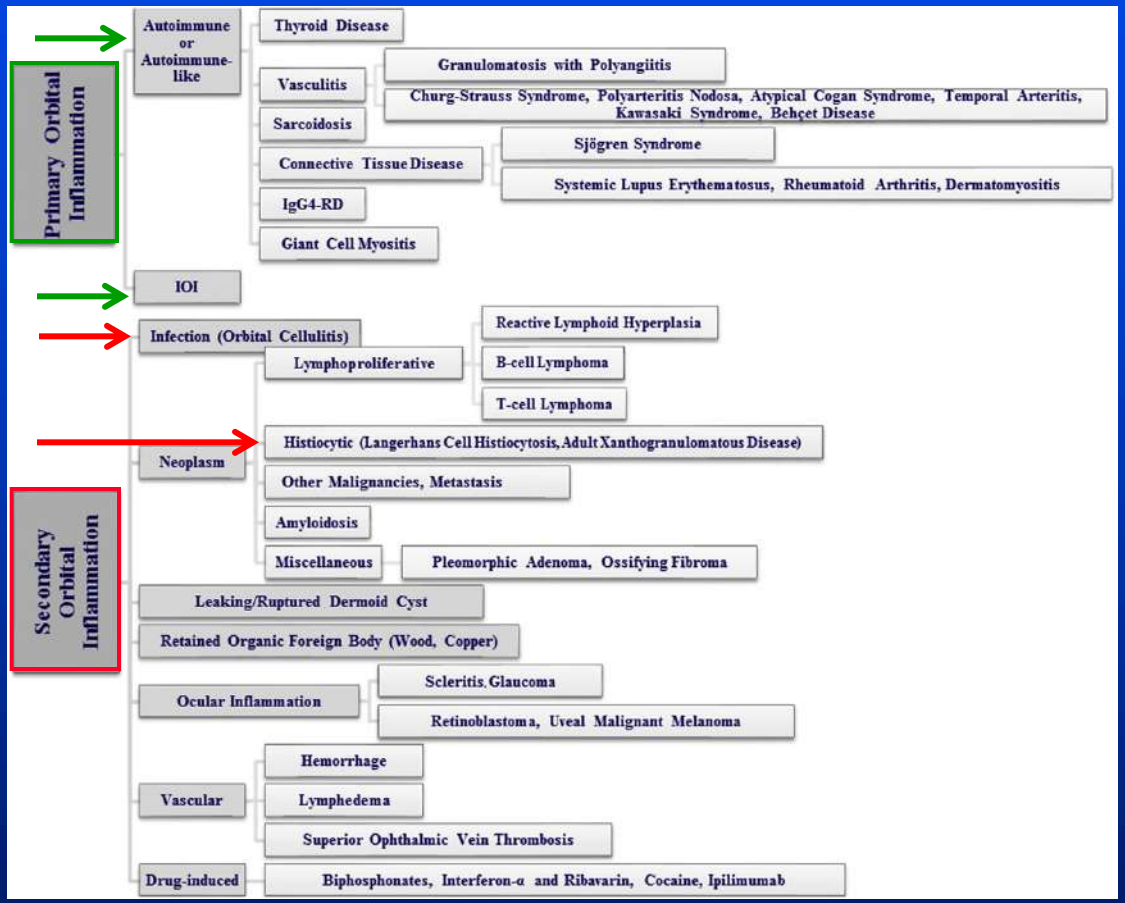
Jerry A. Shields, MD, Carol L. Shields, MD, Richard Scartozzi, MD

Table 2. Classification of 1264 Consecutive Patients with Orbital Lesions

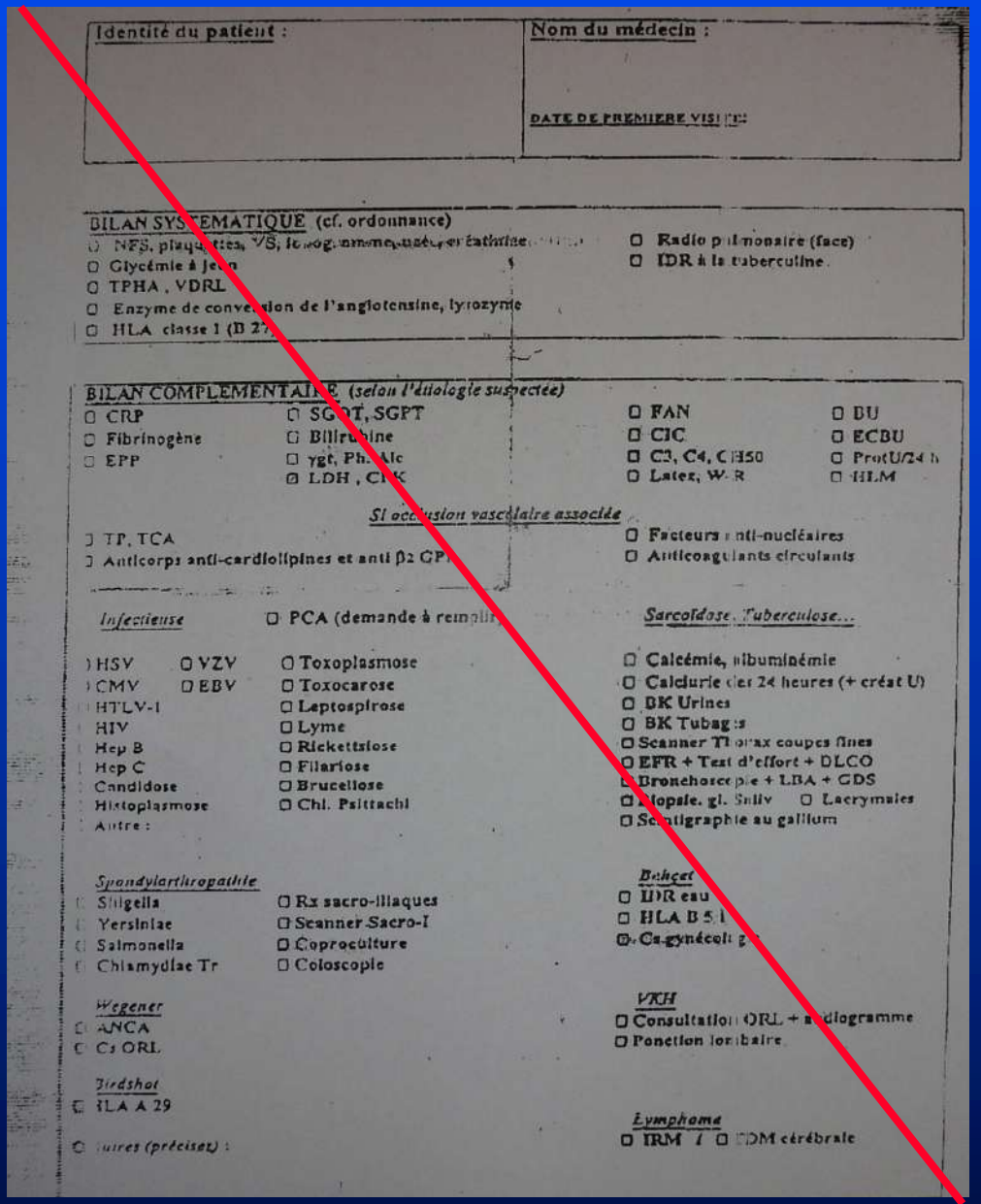
Category	Number of Patients (%)*	Number Biopsy Proven (%)*	% Total Biopsy Proven*	Mean Age (yrs; median, range)
Cystic lesions	70 (6)	39 (56)	3	25 (19, 0–88)
Vasculogenic lesions	213 (17)	87 (41)	7	36 (39, 0–91)
Peripheral nerve lesions	23 (2)	18 (78)	1	38 (36, 0–84)
Optic nerve or meningeal lesions	105 (8)	27 (26)	2	33 (38, 0–90)
Fibrocytic lesions	13 (1)	13 (100)	1	25 (18, 0–65)
Osseous or fibro-osseous lesions	21 (2)	15 (71)	1	26 (20, 3–67)
Cartilaginous lesions	1 (<1)	1 (100)	<1	21 (21, 21–21)
Lipocytic or myxoid lesions	64 (5)	16 (25)	1	45 (54, 0–85)
Myogenic lesions	36 (3)	36 (100)	3	13 (7, 0–68)
Lacrimal gland lesions	114 (9)	77 (68)	6	49 (51, 0–90)
Primary melanocytic lesions	11 (1)	10 (91)	1	57 (65, 29–76)
Metastatic tumors to the orbit	91 (7)	50 (55)	4	60 (61, 5–91)
Lymphoid or leukemic lesions	130 (10)	111 (85)	9	63 (67, 2–92)
Secondary orbital tumors total	142 (11)	123 (87)	10	60 (65, 0–92)
Face origin	7 (1)	4 (57)	1	75 (71, 63–92)
Eyelid origin	25 (2)	23 (92)	2	69 (69, 44–88)
Conjunctival origin	22 (2)	22 (100)	2	68 (69, 44–89)
Intraocular origin	54 (4)	51 (94)	4	55 (65, 0–89)
Paranasal sinus origin	20 (2)	14 (70)	1	60 (62, 21–83)
Nasopharynx origin	6 (<1)	5 (83)	1	53 (51, 34–81)
Hard palate origin	1 (<1)	0 (0)	0	52 (52, 52–52)
Parotid gland origin	1 (<1)	0 (0)	0	71 (71, 71–71)
Lacrimal sac origin	2 (<1)	2 (100)	<1	53 (53, 44–62)
Brain origin	4 (<1)	2 (50)	<1	30 (29, 1–61)
Histiocytic lesions	17 (1)	15 (88)	1	27 (12, 0–81)
Thyroid-related orbitopathy	67 (5)	0 (0)	0	53 (54, 0–86)
Inflammatory lesions	133 (11)	61 (46)	5	43 (47, 0–92)
Miscellaneous	13 (1)	4 (31)	1	30 (18, 0–73)
Total orbital lesions	1264 (100.0)	703 (56)	56	45 (50, 0–92)

Ophthalmology 2004;111:997–1008 © 2004 by the American Academy of Ophthalmology.

Inflammation orbitaire: *Etiologies*



Mombaerts et al. Survey Ophthalmol 2016;61:664-669



Stratégie d'exploration?

- Sémiologie ophtalmologique
  - Uvéites: nomenclature SUN

Am J OPH 2005;140:509-516

- Topographie lésionnelle
  - Et Inflammations orbitaires……..

Survey of 1264 Patients with Orbital Tumors and Simulating Lesions

The 2002 Montgomery Lecture, Part 1

Jerry A. Shields, MD, Carol L. Shields, MD, Richard Scartozzi, MD

Table 17. Subclassification of 133 Patients with Inflammatory Lesions among 1264 Consecutive Patients with Orbital Lesions

Subclassification	Number of Patients (%)*	% of Total Orbital Lesions*	Number Biopsy Proven (%)*	Mean Age in Years (median, range)
Idiopathic nongranulomatous (pseudotumor)	98 (74)	8	34 (35)	45 (48, 2–92)
Infectious	13 (10)	1	6 (46)	29 (11, 2–71)
Inflammation secondary to tumor necrosis				
Retinoblastoma related	4 (3)	<1	4 (100)	1 (1, 0–1)
Uveal melanoma related	2 (2)	<1	1 (50)	77 (77, 70–83)
Total intraocular lesions	6 (5)	<1	5 (83)	26 (1, 0–83)
Granulomatous inflammation				
Nonspecific	5 (4)	<1	5 (100)	57 (55, 40–83)
Wegener's granulomatosis « GPA »	4 (3)	<1	4 (100)	64 (65, 47–78)
Sarcoidosis	2 (2)	<1	2 (100)	24 (24, 14–34)
Vasculitis NOS	1 (1)	<1	1 (100)	82 (82, 82–82)
Total granulomatous	12 (9)	1	12 (100)	56 (55, 14–83)
Kimura's disease	4 (3)	<1	4 (100)	31 (34, 4–54)
Total inflammatory lesions	133 (100)	11	61 (46)	43 (47, 0–92)

NOS = not otherwise specified.
*Percents are rounded.

Ophthalmology 2004;111:997–1008 © 2004 by the American Academy of Ophthalmology.

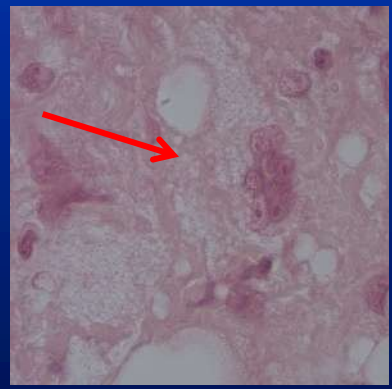
Survey of 1264 Patients with Orbital Tumors and Simulating Lesions

The 2002 Montgomery Lecture, Part 1

Jerry A. Shields, MD, Carol L. Shields, MD, Richard Scartozzi, MD

Table 16. Subclassification of 16 Patients with Histiocytic Lesions among 1264 Consecutive Patients with Orbital Lesions

Subclassification	Number of Patients (%)*	% of Total Orbital Lesions*	Number Biopsy Proven (%)*	Mean Age in Years (median, range)
Eosinophilic granuloma	9 (53)	1	7 (78)	14 (6, 1–81)
Xanthogranuloma	7 (41)	<1	7 (100)	
Erdheim Chester syndrome	4 (25)	<1	4 (100)	54 (56, 28–77)
Adult onset asthma	1 (6)	<1	1 (100)	46 (46, 46–46)
Juvenile xanthogranuloma	1 (6)	<1	1 (100)	0 (0–0)
Angiohistiocytoma	1 (6)	<1	1 (100)	30 (30–30)
Total histiocytic lesions	16 (100)	1	14 (88)	26 (12, 0–81)



Clinical characteristics of inflammatory ocular disease in anti-neutrophil cytoplasmic antibody associated vasculitis: a retrospective cohort study

Patompong Ungprasert[1], Cynthia S. Crowson[1,2], Rodrigo Cartin-Ceba[3], James A. Garrity[4], Wendy M. Smith[4], Ulrich Specks[5], Eric L. Matteson[1,6] and Ashima Makol[1]

1171 patients entre 2003-13

Treatment	EGPA (n = 8)	GPA (n = 152)	MPA (n = 23)	Total (n = 183)	P-value
Demographics					
Age at diagnosis of IOD, mean (S.D.), years	51.0 (20.6)	53.9 (17.9)	46.9 (16.3)	49.0 (17.5)	0.053
Female, n (%)	16 (59)	20 (51)	57 (49)	93 (51)	0.613
Ethnicity, n (%)					0.131
Caucasian	26 (96)	36 (92)	112 (96)	174 (95)	
African-American	0 (0)	1 (3)	0 (0)	1 (1)	
Native Hawaiian/other Pacific islander	1 (4)	0 (0)	0 (0)	1 (1)	
Asian	0 (0)	1 (3)	3 (3)	4 (2)	
Native American	0 (0)	1 (3)	0 (0)	1 (1)	
Other	0 (0)	0 (0)	2 (2)	2 (1)	
Duration of follow-up[a], median (IQR), years	6.0 (3.3–9.7)	5.5 (2.1–9.9)	7.0 (3.9–10.9)	6.6 (3.4–10.7)	0.318
Clinical characteristics					
IOD onset prior or at diagnosis of AAV, n (%)	18 (67)	27 (69)	52 (44)	97 (53)	0.008
IOD onset after diagnosis of AAV, n (%)	9 (33)	12 (31)	65 (56)	86 (47)	
Time from IOD to AAV diagnosis for those with IOD onset prior to/at diagnosis of AAV, mean (S.D.), months	11.1 (11.3)	6.0 (13.8)	5.9 (11.7)	6.9 (12.3)	0.035
Time from AAV diagnosis to IOD for those who had IOD onset after AAV, mean (S.D.), months	92.2 (89.5)	25.9 (22.4)	64.4 (64.9)	61.9 (65.4)	0.084
BVAS/GPA at IOD onset, mean (S.D.)	2.7 (2.6)	5.7 (4.2)	5.3 (3.9)	5.0 (3.9)	0.002

Rheumatology 2017;56:1663–1770.

Clinical characteristics of inflammatory ocular disease in anti-neutrophil cytoplasmic antibody associated vasculitis: a retrospective cohort study

Patompong Ungprasert[1], Cynthia S. Crowson[1,2], Rodrigo Cartin-Ceba[3], James A. Garrity[4], Wendy M. Smith[4], Ulrich Specks[5], Eric L. Matteson[1,6] and Ashima Makol[1]

1171 patients entre 2003-13

Treatment	EGPA (n = 8)	GPA (n = 152)	MPA (n = 23)	Total (n = 183)	P-value
Type of eye disease, n (%)					
Scleritis	0 (0)	36 (24)	4 (17)	40 (22)	0.246
Episcleritis	2 (25)	32 (21)	5 (22)	39 (21)	0.964
Orbital inflammation	0 (0)	32 (21)	1 (4)	33 (18)	0.060
Lacrimal duct stenosis	0 (0)	19 (13)	0 (0)	19 (10)	0.115
Uveitis	0 (0)	15 (10)	1 (4)	16 (9)	0.457
Conjunctivitis	0 (0)	9 (6)	3 (13)	12 (7)	6
Cranial nerve II, IV or VI palsy	3 (38)	4 (3)	4 (17)	11 (6)	0.001
Peripheral ulcerative keratitis	0 (0)	5 (3)	2 (9)	7 (4)	0.383
Dacryoadenitis	0 (0)	8 (5)	0 (0)	8 (4)	0.426
Optic neuritis	1 (13)	5 (3)	1 (4)	7 (4)	0.412
Amaurosis fugax	2 (25)	5 (3)	0 (0)	7 (4)	0.005
Retinal vasculitis	0 (0)	2 (1)	1 (4)	3 (2)	0.528
Laterality of IOD, n (%)					0.243
Unilateral	5 (63)	94 (62)	10 (43)	109 (59)	
Bilateral	3 (38)	58 (38)	13 (57)	74 (41)	

2,8%

0.7%

Rheumatology 2017;56:1663–1770.

Clinical characteristics of inflammatory ocular disease in anti-neutrophil cytoplasmic antibody associated vasculitis: a retrospective cohort study

Patompong Ungprasert[1], Cynthia S. Crowson[1,2], Rodrigo Cartin-Ceba[3], James A. Garrity[4], Wendy M. Smith[4], Ulrich Specks[5], Eric L. Matteson[1,6] and Ashima Makol[1]

Treatment	Negative ANCA (n = 27)	p-ANCA/ MPO-ANCA (n = 39)	c-ANCA/ PR3-ANCA (n = 117)	Total (n = 183)	P-value
Type of eye disease, n (%)					
Scleritis	1 (4)	5 (13)	34 (29)	40 (22)	0.005
Episcleritis	1 (4)	10 (26)	28 (24)	39 (21)	0.052
Orbital inflammation	12 (44)	6 (15)	15 (13)	33 (18)	0.001
Lacrimal duct stenosis	3 (11)	0 (0)	16 (14)	19 (10)	0.053
Uveitis	1 (4)	1 (3)	14 (12)	16 (9)	0.120
Conjunctivitis	1 (4)	5 (13)	6 (5)	12 (7)	0.197
Cranial nerve II, IV or VI palsy	3 (11)	6 (15)	2 (2)	11 (6)	0.004
Peripheral ulcerative keratitis	0 (0)	4 (10)	3 (3)	7 (4)	0.051
Dacryoadenitis	3 (11)	2 (5)	3 (3)	8 (4)	0.142
Optic neuritis	1 (4)	3 (8)	3 (3)	7 (4)	0.351
Amaurosis fugax	2 (8)	2 (5)	3 (3)	7 (4)	0.443
Retinal vasculitis	1 (4)	1 (3)	1 (1)	3 (2)	0.505
Laterality of IOD, n (%)					0.927
Unilateral	17 (63)	23 (59)	69 (59)	109 (60)	
Bilateral	10 (37)	16 (41)	48 (41)	74 (40)	

Rheumatology 2017;56:1663–1770.

Orbital and Adnexal Involvement in Sarcoidosis: Analysis of Clinical Features and Systemic Disease In 30 Cases

379 patients entre 2000-08

HAKAN DEMIRCI AND MURRAY D. CHRISTIANSON

TABLE 1. Anatomic Localization of Involvement in 30 Consecutive Patients with Histopathologically Confirmed Orbital and Adnexal Sarcoidosis

	No. of Eyes (%)
Anteroposterior location of orbital and adnexal sarcoidosis	
Anterior orbit	29 (97%)
Midorbit	1 (3%)
Posterior orbit	0 (0%)
Radial location of orbital and adnexal sarcoidosis	
Superior	20 (67%)
Inferior	4 (13%)
Nasal	2 (7%)
Diffuse	4 (13%)
Conal location of orbital and adnexal sarcoidosis	
Extraconal	29 (97%)
Intraconal	1 (3%)
Muscle involvement	
Superior rectus	1 (3%)
Involved orbital and adnexal organs	
Lacrimal gland	19 (63%)
Eyelid	5 (17%)
Orbit	4 (13%)
Lacrimal sac	2 (7%)

5%

1%

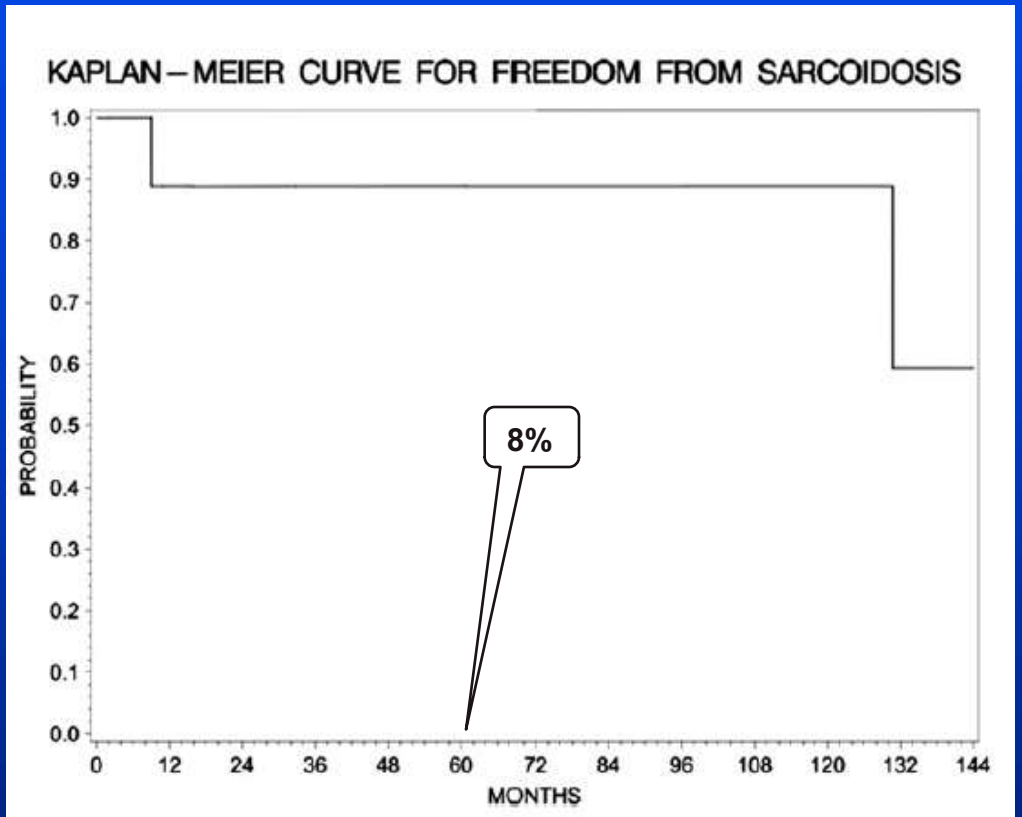


FIGURE 3. Kaplan-Meier survival analysis of 19 patients with orbital and adnexal sarcoidosis and no evident systemic sarcoidosis at presentation.

Ophthalmology 2011;151:1074–1080 © 2011 by the American Academy of Ophthalmology.

Bilateral Lacrimal Gland Disease

Clinical Features of 97 Cases

Juin 2005- Juillet 2013

Sunny X. Tang, BA,[1] Renelle P. Lim, MD,[1] Saad Al-Dahmash, MD,[2,3] Sean M. Blaydon, MD,[4] Raymond I. Cho, MD,[5] Christina H. Choe, MD,[6] Michael A. Connor, MD,[7] Vikram D. Durairaj, MD,[8] Lauren A. Eckstein, MD,[6] Brent Hayek, MD,[9] Paul D. Langer, MD,[10] Gary J. Lelli, MD,[11] Ronald Mancini, MD,[12] Alexander Rabinovich, MD,[13] Javier Servat, MD,[14] John W. Shore, MD,[4] Jason A. Sokol, MD,[15] Angelo Tsirbas, MD,[16] Edward J. Wladis, MD,[17] Albert Y. Wu, MD,[18] Jerry A. Shields, MD,[2] Carol Shields, MD,[2] Roman Shinder, MD[1,4]

Table 1. Bilateral Lacrimal Gland Diseases in 97 Patients: Demographics per Diagnosis

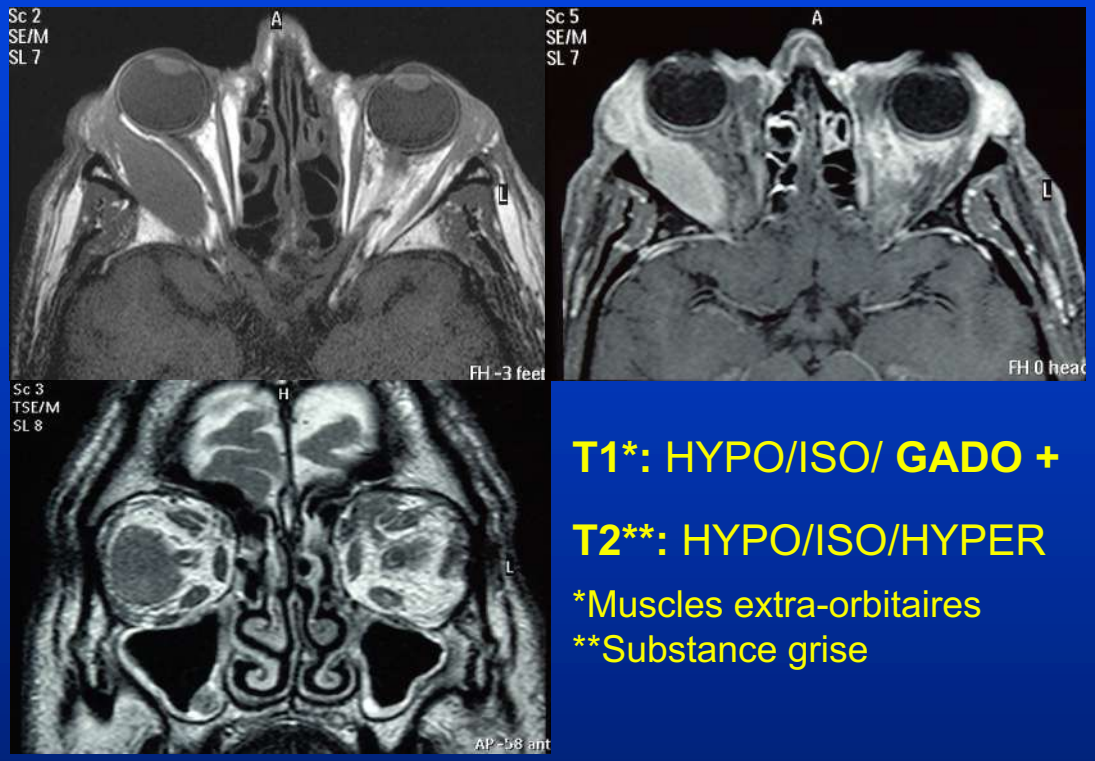
Diagnosis	No. (%)	Age (yrs)		Sex, no. (%)		Race, no. (%)		
		Mean	*Range*	*Female*	*Male*	*Black*	*White*	*Hispanic*
Total	97	46	8–84	75 (77)	22 (23)	48 (49)	37 (38)	12 (12)
Inflammatory	51 (53%)	42*	15–84	39 (76)	12 (24)	27 (53)	18 (35)	6 (12)
IOI	29 (30%)	42	15–84	20 (69)	9 (31)	12 (41)	12 (41)	5 (17)
Sarcoidosis	19 (20%)	42	26–68	16 (84)	3 (16)	15 (79)†	3 (16)*	1 (5)
Sjögren's syndrome	3 (3%)	48	45–51	3 (100)	0 (0)	0 (0)	3 (100)	0 (0)
Structural	20 (21%)	43	8–82	17 (85)	3 (15)	10 (50)	6 (30)	4 (20)
Lacrimal gland prolapse	15 (15%)	39	8–64	14 (93)	1 (7)	9 (60)	2 (13)*	4 (27)
Dacryops	5 (5%)	55	34–82	6 (60)	2 (40)	1 (20)	4 (80)	0 (0)
Lymphoproliferative	19 (20%)	57‡	15–79	15 (79)	4 (21)	7 (37)	11 (58)	1 (5)
Lymphoma	11 (11%)	64‡	46–79	8 (72)	3 (27)	4 (36)	7 (64)	0 (0)
Lymphoid hyperplasia	8 (8%)	49	15–63	7 (88)	1 (13)	3 (38)	4 (50)	1 (13)
Uncommon entities	7 (7%)	51	10–78	4 (57)	3 (53)	4 (57)	2 (29)	1 (14)
Rosai Dorfman disease	3 (3%)	47	10–78	1 (33)	2 (67)	2 (67)	1 (33)	0 (0)
Erdheim Chester disease	2 (2%)	58	56–60	1 (50)	1 (50)	1 (50)	0 (0)	1 (50)
Necrotizing granulomatous disease	1 (1%)	38	—	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)
Extramedullary hematopoiesis	1 (1%)	61	—	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)

IOI = idiopathic orbital inflammation.
*$P<0.05$.
†$P<0.01$.
‡$P<0.001$.
Boldface represents categories of disease.

Ophthalmology 2014;121:2040–2046

Lymphomes Non Hodgkiniens

- **Type B 95%**
- **Bas grade 80% (MALT +++)**
- **Atteinte nodale 0➔24%**
- **Grade IV 15%**



T1*: HYPO/ISO/ **GADO +**

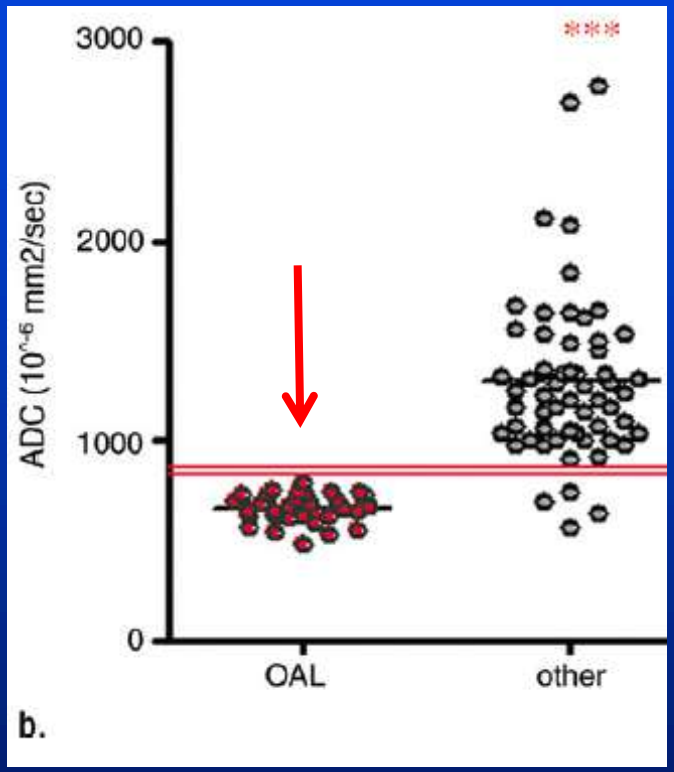
T2**: HYPO/ISO/HYPER

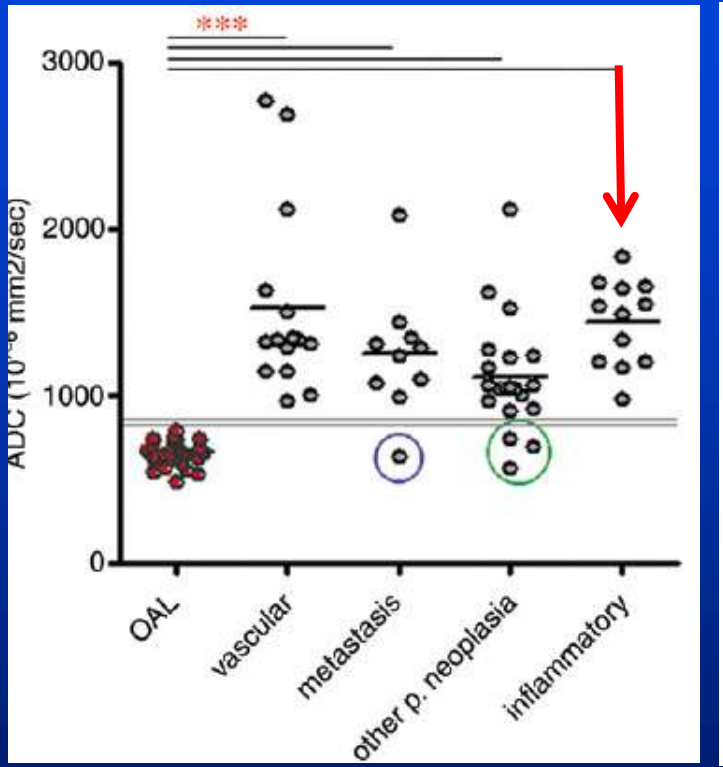
*Muscles extra-orbitaires
**Substance grise

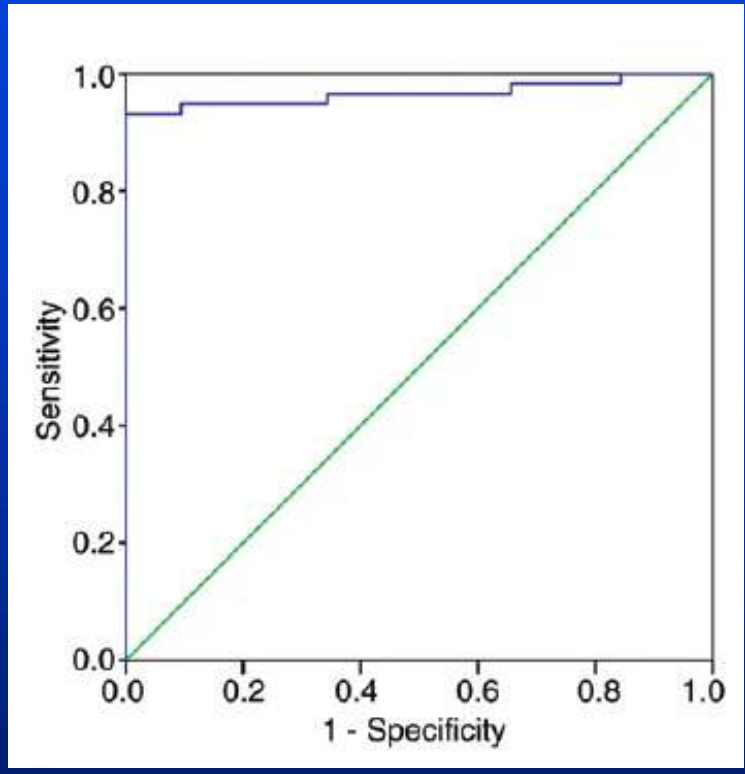
Decaudin et al. Blood 2006;108:1451–1460 © 2004 by the American Society of Hematology.

Ocular Adnexal Lymphoma:

Diffusion-weighted MR Imaging for Differential Diagnosis and Therapeutic Monitoring[1]



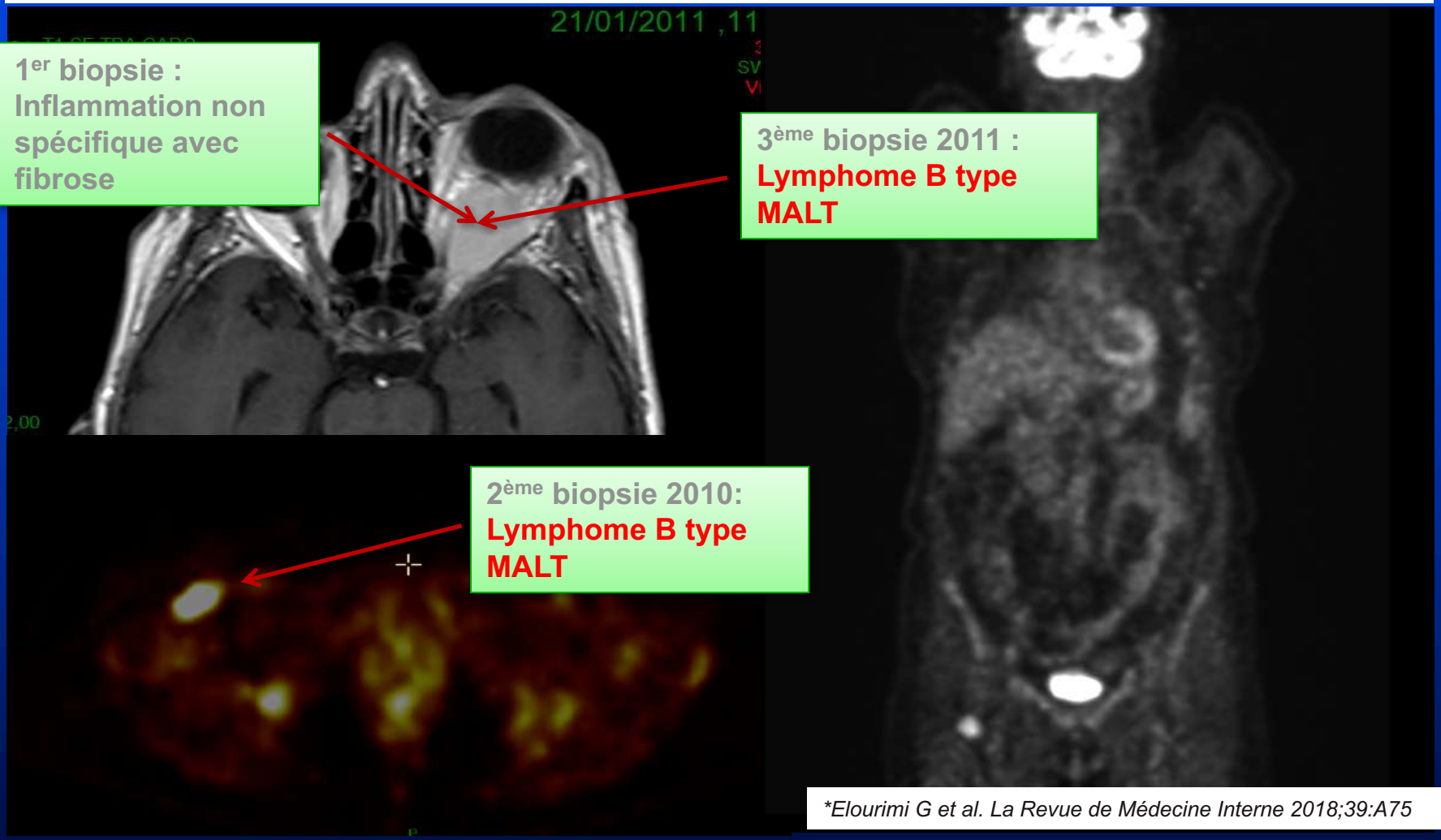




Politi et al. Radiology 2010;256:565-574.

*Intérêt du TEP-18-FDG au diagnostic d'orbitopathies inflammatoires**

- **Patiente 70 ans, explorée pour une IO en 2010**
- **Gonflement, induration, bilatéralisation en 1 an**
- **Pas de signes extra-orbitaires, pas de syndrome inflammatoire!**



*Elourimi G et al. La Revue de Médecine Interne 2018;39:A75

Bilateral Lacrimal Gland Disease

Clinical Features of 97 Cases

Juin 2005- Juillet 2013

Sunny X. Tang, BA,[1] Renelle P. Lim, MD,[1] Saad Al-Dahmash, MD,[2,3] Sean M. Blaydon, MD,[4] Raymond I. Cho, MD,[5] Christina H. Choe, MD,[6] Michael A. Connor, MD,[7] Vikram D. Durairaj, MD,[8] Lauren A. Eckstein, MD,[6] Brent Hayek, MD,[9] Paul D. Langer, MD,[10] Gary J. Lelli, MD,[11] Ronald Mancini, MD,[12] Alexander Rabinovich, MD,[13] Javier Servat, MD,[14] John W. Shore, MD,[4] Jason A. Sokol, MD,[15] Angelo Tsirbas, MD,[16] Edward J. Wladis, MD,[17] Albert Y. Wu, MD,[18] Jerry A. Shields, MD,[2] Carol Shields, MD,[2] Roman Shinder, MD[1,4]

Table 1. Bilateral Lacrimal Gland Diseases in 97 Patients: Demographics per Diagnosis

Diagnosis	No. (%)	Age (yrs)		Sex, no. (%)		Race, no. (%)		
		Mean	*Range*	*Female*	*Male*	*Black*	*White*	*Hispanic*
Total	97	46	8–84	75 (77)	22 (23)	48 (49)	37 (38)	12 (12)
Inflammatory	51 (53%)	42*	15–84	39 (76)	12 (24)	27 (53)	18 (35)	6 (12)
IOI	29 (30%)	42	15–84	20 (69)	9 (31)	12 (41)	12 (41)	5 (17)
Sarcoidosis	19 (20%)	42	26–68	16 (84)	3 (16)	15 (79)	3 (16)*	1 (5)
Sjögren's syndrome	3 (3%)	48	45–51	3 (100)	0 (0)	0 (0)	3 (100)	0 (0)
Structural	20 (21%)	43	8–82	17 (85)	3 (15)	10 (50)	6 (30)	4 (20)
Lacrimal gland prolapse	15 (15%)	39	8–64	14 (93)	1 (7)	9 (60)	2 (13)*	4 (27)
Dacryops	5 (5%)	55	34–82	3 (60)	2 (40)	1 (20)	4 (80)	0 (0)
Lymphoproliferative	19 (20%)	57‡	25–79	15 (79)	4 (21)	7 (37)	11 (58)	1 (5)
Lymphoma	11 (11%)	64‡	46–79	8 (72)	3 (27)	4 (36)	7 (64)	0 (0)
Lymphoid hyperplasia	8 (8%)	47	15–63	7 (88)	1 (13)	3 (38)	4 (50)	1 (13)
Uncommon entities	7 (7%)	51	10–78	4 (57)	3 (53)	4 (57)	2 (29)	1 (14)
Rosai Dorfman disease	3 (3%)	47	10–78	1 (33)	2 (67)	2 (67)	1 (33)	0 (0)
Erdheim Chester disease	2 (2%)	58	56–60	1 (50)	1 (50)	1 (50)	0 (0)	1 (50)
Necrotizing granulomatous disease	1 (1%)	38	—	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)
Extramedullary hematopoiesis	1 (1%)	61	—	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)

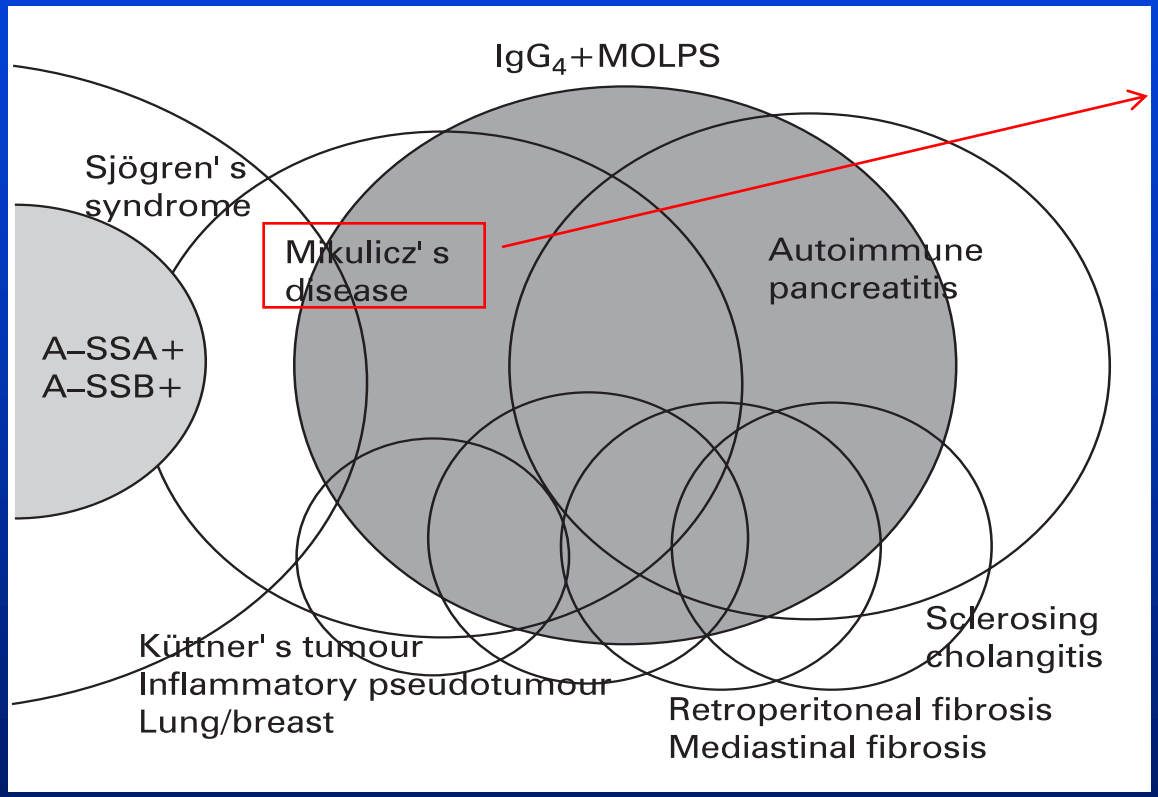
IOI = idiopathic orbital inflammation.
*$P<0.05$.
†$P<0.01$.
‡$P<0.001$.
Boldface represents categories of disease.

Maladie associée aux IgG4 ?

Ophthalmology 2014;121:2040–2046

Proposal for a new clinical entity, IgG_4-positive multiorgan lymphoproliferative syndrome: analysis of 64 cases of IgG_4-related disorders

Masaki et al. Ann Rheum Dis 2009



In 1888, Johann von Mikulicz-Radecki reported a man with symmetrical swelling of the lacrimal, submandibular and parotid glands of unknown aetiology.[1] Histologically, the swollen glands showed massive mononuclear cell infiltration,

1/ Immunohistochimie:

- Lympho-plasmocytes IgG4 (IgG4/IgG total plasma cells > 40%)
- Fibrose/ sclérose tissulaire

2/ IgG4 sérique > 135 mg/l

Okazaki K et Umehara H. Int J Rheumatol. 2012

Ophthalmologic characteristics according to IgG4 immunostaning in patients with biopsy proven IOIS from the literature review and cohort SIOI

	Plaza et al. 2011		Deschamps et al. 2013		Andrew et al. 2015		Sa et al. 2015		Abad et al. 2018			Pooled data†		
	IgG4+ n: 11	IgG4- n: 10	IgG4+ n: 10	IgG4- n:15	IgG4+ n: 18	IgG4- n: 47	IgG4+ n: 11	IgG4- n: 13	IgG4+ n: 13	IgG4- n: 21	*P*	IgG4+ n: 63	IgG4- n: 106	Total n: 169
Ophthalmologic locations, n°(/n%)														
- Lacrimal gland	10(91)	8(80)	8(80)	10(66)	14(77)	34(73)	10(91)	4(30)	8(61.5)	10(47)	0.43	50(79)	66(62)	116(68)
- Extra ocular muscles	5(45)	4(36)	4(40)	5(33)	6(33)	21(46)	0	4(30)	4(31)	5(31)	0.7	19(30)	39(36.8)	58(34)
- Globe/ sclera	0	0	0	0	1(6)	2(5.4)	0	0	2(15.5)	4(19)	1	3(4.75)	6(5.5)	9(5.5)
- Orbital fat	2(18)	1(10)	6(60)	8(53)	8(44)	15(32)	1(9)	9(70)	10(77)	13(62)	0.46	27(43)	46(43)	73(43)
- Apex	0	0	1(10)	1(6)	0	0	0	0	4(31)	4(19)	0.68	5(8)	5(4.5)	10(6)
- Optic nerve	1(9)	0	3(30)	6(40)	NA	NA	NA	NA	4(31)	9(43)	0.7	8(12.5)	15(14)	23(13.5)
-Trigeminal nerve	/	/	/	/	/	/	/	/	4/10°(40)	1/16°(6.2)	0.055			
- Bilateral presentation	6(55)	0	2(20)	2(13)	6(35)	6(13)	10(91)	5(39)	6(46)	5(24)	0.26	30(47.5)	18(14)	48(28.5)

† P values are based on the chi-square test or Fisher's exact test, as appropriate. P values below 0.05 were considered to denote significant differences.

° Imaging analysis was inconclusive for three IgG4-positive patients and five IgG4-negative patients.

Ophthalmologic characteristics according to IgG4 immunostaning in patients with biopsy proven IOIS from the literature review and cohort SIOI

37%

	Plaza et al. 2011		Deschamps et al. 2013		Andrew et al. 2015		Sa et al. 2015		Abad et al. 2018			Pooled data†		
	IgG4+ n: 11	IgG4- n: 10	IgG4+ n: 10	IgG4- n:15	IgG4+ n: 18	IgG4- n: 47	IgG4+ n: 11	IgG4- n: 13	IgG4+ n: 13	IgG4- n: 21	*P*	IgG4+ n: 63	IgG4- n: 106	Total n: 169
Ophthalmologic locations, n°(/n%)														
- Lacrimal gland	10(91)	8(80)	8(80)	10(66)	14(77)	34(73)	10(91)	4(30)	8(61.5)	10(47)	0.43	50(79)	66(62)	116(68)
- Extra ocular muscles	5(45)	4(36)	4(40)	5(33)	6(33)	21(46)	0	4(30)	4(31)	5(31)	0.7	19(30)	39(36.8)	58(34)
- Globe/ sclera	0	0	0	0	1(6)	2(5.4)	0	0	2(15.5)	4(19)	1	3(4.75)	6(5.5)	9(5.5)
- Orbital fat	2(18)	1(10)	6(60)	8(53)	8(44)	15(32)	1(9)	9(70)	10(77)	13(62)	0.46	27(43)	46(43)	73(43)
- Apex	0	0	1(10)	1(6)	0	0	0	0	4(31)	4(19)	0.68	5(8)	5(4.5)	10(6)
- Optic nerve	1(9)	0	3(30)	6(40)	NA	NA	NA	NA	4(31)	9(43)	0.7	8(12.5)	15(14)	23(13.5)
-Trigeminal nerve	/	/	/	/	/	/	/	/	4/10°(40)	1/16°(6.2)	0.055			
- Bilateral presentation	6(55)	0	2(20)	2(13)	6(35)	6(13)	10(91)	5(39)	6(46)	5(24)	0.26	30(47.5)	18(14)	48(28.5)

† P values are based on the chi-square test or Fisher's exact test, as appropriate. P values below 0.05 were considered to denote significant differences.
° Imaging analysis was inconclusive for three IgG4-positive patients and five IgG4-negative patients.

Abad et al. Acta Ophthalmologica 2018.

Ophthalmologic characteristics according to IgG4 immunostaning in patients with biopsy proven IOIS from the literature review and cohort SIOI

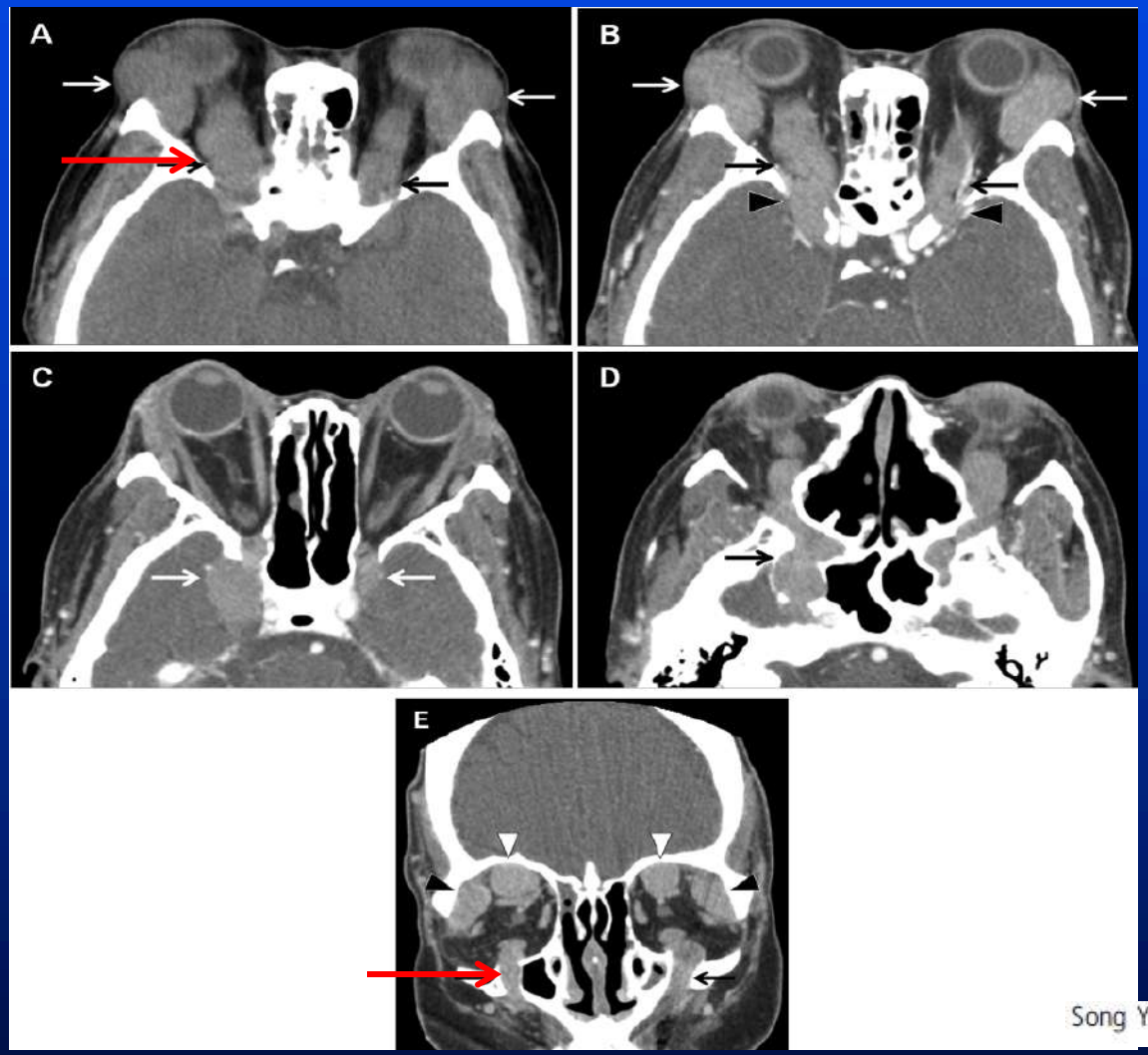
	Plaza et al. 2011		Deschamps et al. 2013		Andrew et al. 2015		Sa et al. 2015		Abad et al. 2018			Pooled data†		
	IgG4+ n: 11	IgG4- n: 10	IgG4+ n: 10	IgG4- n:15	IgG4+ n: 18	IgG4- n: 47	IgG4+ n: 11	IgG4- n: 13	IgG4+ n: 13	IgG4- n: 21	*P*	IgG4+ n: 63	IgG4- n: 106	Total n: 169
Ophthalmologic locations, n°(/n%)														
- Lacrimal gland	10(91)	8(80)	8(80)	10(66)	14(77)	34(73)	10(91)	4(30)	8(61.5)	10(47)	0.43	50(79)	66(62)	116(68)
- Extra ocular muscles	5(45)	4(36)	4(40)	5(33)	6(33)	21(46)	0	4(30)	4(31)	5(31)	0.7	19(30)	39(36.8)	58(34)
- Globe/ sclera	0	0	0	0	1(6)	2(5.4)	0	0	2(15.5)	4(19)	1	3(4.75)	6(5.5)	9(5.5)
- Orbital fat	2(18)	1(10)	6(60)	8(53)	8(44)	15(32)	1(9)	9(70)	10(77)	13(62)	0.46	27(43)	46(43)	73(43)
- Apex	0	0	1(10)	1(6)	0	0	0	0	4(31)	4(19)	0.68	5(8)	5(4.5)	10(6)
- Optic nerve	1(9)	0	3(30)	6(40)	NA	NA	NA	NA	4(31)	9(43)	0.7	8(12.5)	15(14)	23(13.5)
-Trigeminal nerve	/	/	/	/	/	/	/	/	4/10°(40)	1/16°(6.2)	0.055			
- Bilateral presentation	6(55)	0	2(20)	2(13)	6(35)	6(13)	10(91)	5(39)	6(46)	5(24)	0.26	30(47.5)	18(14)	48(28.5)

† P values are based on the chi-square test or Fisher's exact test, as appropriate. P values below 0.05 were considered to denote significant differences.
° Imaging analysis was inconclusive for three IgG4-positive patients and five IgG4-negative patients.

Abad et al. Acta Ophthalmologica 2018.

Ocular adnexal IgG4-related disease: CT and MRI findings

Yong Sub Song,[1] Ho-Kyung Choung,[2,3] Sun-Won Park,[1,4] Ji-Hoon Kim,[1] Sang In Khwarg,[3] Yoon Kyung Jeon[5]



Song YS, *et al*. *Br J Ophthalmol* 2013;**97**:412–418.

Table 4: Systemic features and IgG4-RD status of patients with biopsy-proven IOIS

	Orbital IgG4 immunostaining		
	IgG4+ n : 13	IgG4- n : 21	Total n : 34
IgG4-related disease£, #(/n)			
Definite (including serum IgG4 ≥ 1.35 g/l)	3/11*(27) **#18,*21*,24**	0/19*(0)	3/30*(10)
- Probable	8/11*(73) #1,2,15,16,17,20,22,*23*	0/19*(0)	9/30*(30)
IgG4-related disease$, #(/n)			
- ≥ 100 cells/hpf	2/13(15) **#18,*21***,22	0/21(0)	2(8)
Systemic features, #(/n)			
- Combined features listed below	2/13(15)	3/21(14)	5(14.5)
• Pulmonary nodules + pANCA anti-PR3 (≥10 IU/ml)	0	#29(13 IU/ml)	1
• Sinusitis + pulmonary nodules	0	#6,*8*	2
• Asthma + eosinophilia > 10%	**#18**	0	1
• Reccurent sinusitis + pulmonary nodules + eosinophilia> 10%	**#24**	0	1
- Isolated features listed below	5/13(38)	4/20**(20)	9/33**(27)
• Sinusitis	#3,16,*19*,20,***21***	#27	6
• Pulmonary nodules	0	#4,10	2
• pANCA anti-MPO (≥10 IU/ml)	0	#*11*(54 IU/ml)	1
• Other manifestations	0	0	0

£ IgG4-RD was considered as definite when patients fulfilled all Umehara's criteria (in bold).
$ Histopathological features were considered highly suggestive of IgG4-RD when IgG4-positive plasma cell infiltration reached the cutoff of 100 cells per high-power field (/hpf) from the consensus statement on the pathology of IgG4-RD.
*IgG4 serum unavailable at inclusion for IgG4-positive patients #3 and 19, IgG4-negative patients #13 and 30.
**ANCA serology unavailable at diagnosis for IgG4-negative patient #8.
Patients who received immunosuppressive treatment within the last 6 months before inclusion are shown in italics.
ANCA: Antineutrophil cytoplasmic antibodies.
MPO: Myeloperoxidase.
PR3: Proteinase-3.

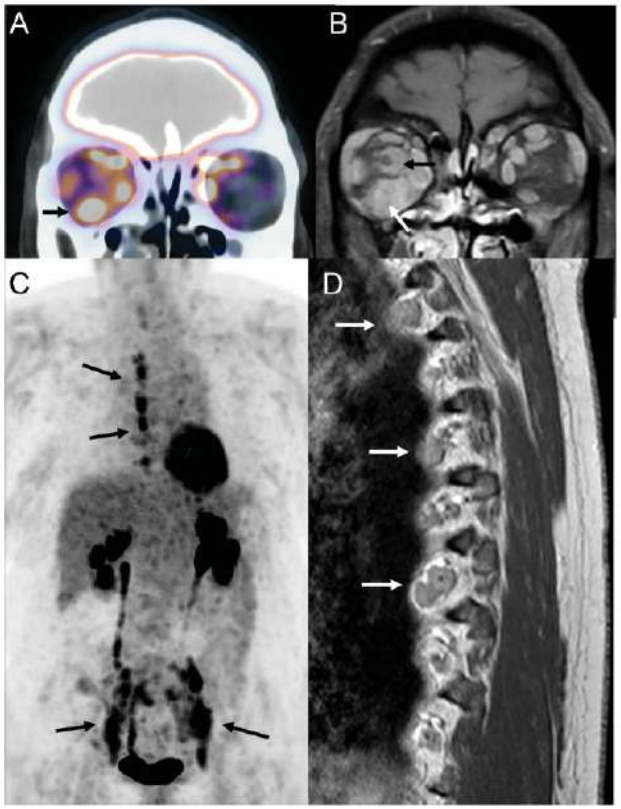
Abad et al. Acta Ophthalmologica 2018.

IgG4-related diffuse perineural disease

Michael Soussan, MD, Aicha Medjoul, MD, Isabelle Badelon, MD, Alexis Guillot, MD, Antoine Martin, MD, PhD, Sébastien Abad, MD, PhD

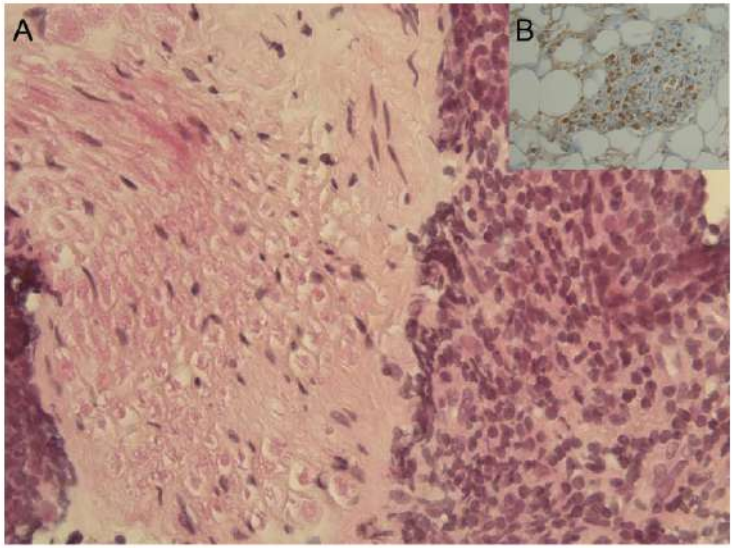
From the Departments of Nuclear Medicine (M.S.), Radiology (A. Medjoul), Ophtalmology (I.B.), Dermatology (A.G.), Pathology (A. Martin), and Internal Medicine (S.A.), Université Paris 13, Faculté Léonard de Vinci, Hôpital Avicenne, Assistance Publique-Hôpitaux de Paris (AP-HP), Paris, France.

Figure 1 Imaging findings of nerve roots



Right orbit (A) and paravertebral (C) FDG uptakes (SUV max = 7). MRI shows meningeal infiltration of the right optic nerve (B, black arrow), a thickening of inferior orbital muscle (B, white arrow), and a diffuse infiltration of paravertebral nerve roots (D).

Figure 2 Pathologic findings of the biopsy from the paravertebral mass



A perineural lymphoplamacytic infiltrate was observed. Note that endoneurium is unremarkable without inflammatory cell infiltration (A, hematoxylin & eosin × 40). Immunohistochemical staining for immunoglobulin G4 (IgG4) revealed approximatively 50 IgG4-positive plasma cells/high-power field (B, immunoperoxidase × 40).

Examen Ophtalmologique
- Formes anatomocliniques
- Signes orbitopalpébraux

Manifestations orbitaires caractéristiques
Maladie de Basedow +++

Manifestations systémiques

Signes cliniques
Asthme, sinusite, sarcoïdes…….

Examens complémentaires

Myosite

TSHus/
TRAK/ Ac anti-TPO

NFS-Plaquettes
CRP-Fibrinogène
Créatininémie - BU- Prot/creat U
gGT/PAL/ASAT/ALAT
EPP

Xanthogranulomatoses périorbitaires

+ Immunofixation

Scanner thoracique (TEP scan ?)
ECA/ BGSA
ANCA

Dacryoadénites

Nerf Trijumeau

IgG4 sériques

+/-

BIOPSIE → **SIOI (si IgG4-)**

Merci pour votre attention