Rheumatology Rules for Uveitis

Christian J. Thompson, OD
Valerie Sharpe, OD FAAO
Chinle Hospital, IHS, DHHS
Chinle, AZ
christian.thompson@ihs.gov
valerie.sharpe@ihs.gov

James O. Posever, MD
Phoenix Indian Medical Center
PIMC, IHS, DHHS
Phoenix, AZ
james.posever@ihs.gov

ABSTRACT

This lecture will highlight the importance of collaboration between optometry and rheumatology in the management of uveitis. Emphasis will be placed upon current classification schemes, diagnostic testing and treatment modalities. The provider will also gain further understanding of the autoimmune conditions associated with uveitis.

LEARNING OBJECTIVES

1. To provide tools for optometrists to collaborate appropriately with rheumatology
2. To enhance awareness of the autoimmune diseases associated with uveitis
3. To review the laboratory testing needed to confirm ocular & systemic diagnoses
4. To become familiar with the systemic treatments prescribed by rheumatologists

OUTLINE

I. Introduction

- A. Co-management with rheumatology
  1. Why do optometrists need a working relationship with a rheumatologist?
     a) Uveitis requires uncompromised control
     b) Paradigm shift in management
     c) Uveitis may be the result of underlying systemic disease
  2. Why do rheumatologists need a working relationship with optometrists?
     a) Autoinflamatory & autoimmune diseases have ocular manifestations
     b) Ocular clues can contribute to systemic diagnosis
     c) Ocular status informs systemic management
- B. Case#1: JIA patient
  1. Optometric exam: the uveitis that wouldn't quit
     a) History
        1) 9 year old female with chronic uveitis
        2) Poor adherence to management
     b) Entrance exam
     c) Slit lamp exam
     d) Diagnosis
     e) Management
  2. Rheumatologic exam: the professional relationship that facilitated remission
     a) Clinical exam
     b) Management

II. Rheumatology Basics

- A. A necessary foundation for relating to the rheumatologist
  1. Basic immunology (immunology nuts & bolts)

a) Innate immunity
b) Adaptive immunity
c) Immunological tolerance
d) Autoimmunity

2. Common rheumatologic diseases
   a) Rheumatoid arthritis
   b) Juvenile idiopathic arthritis (JIA)
   c) Sarcoid
   d) Systemic lupus erythematosus (SLE)
   e) Sjogren's disease
   f) Seronegative spondyloartropathy (see also Section III)
3. Common rheumatologic medications
   a) NSAIDs
      1) Salicylates
      2) Indoles
      3) Phenylalkanoic acids
      4) Cox-2 inhibitors
   b) Corticosteroids
   c) DMARDs / Immunosupprants
      1) Alkylating agents
      2) Antimetabolites
      3) Antibiotics
      4) Biologic agents

B. Case#2: Rheumatoid arthritis & Dry Eye
1. Optometric exam
   a) Entrance exam
   b) Slit lamp exam
   c) Diagnosis
   d) Management
2. Rheumatologic exam
   a) Clinical exam
   b) Management
3. Infusion clinic
   a) Patient education
   b) Common adverse reactions & toxicity
   c) Practical considerations: time, cost and comfort

III. Anterior Uveitis and the Spondyloarthropathies

A. Uveitis basics
1. Uveitis: a comprehensive term
   a) Definitions
   b) Epidemiology
   c) Ocular Complications
   d) Basic anatomy
   e) Standardized Uveitis Nomenclature (SUN)
      1) SUN Working Group criteria

2) Classification
3) Descriptors
4) Grading scheme
5) Activity

2. Acute Anterior Uveitis (AAU)
   a) Signs & symptoms
   b) Ocular examination
   c) Diagnosis
   d) Management
   e) Clinical pearls
3. Case#3: Acute Anterior Uveitis (AAU)
   a) Entrance exam
   b) Slit lamp exam
   c) Posterior segment
   d) Diagnosis
   e) Management

B. The spondyloarthropathies
1. Classification (a basic overview)
   a) Ankylosing spondylitis
   b) Reactive arthritis (ReA)
   c) Inflammatory bowel disease (IBD)
   d) Psoriatic arthritis
   e) Juvenile spondyloarthropathy
   f) Undifferentiated
2. Simple work-up for the optometrist
   a) Medical history
   b) Current symptoms
   c) Laboratory testing & imaging (see below)
3. Basic systemic management

IV. Laboratory Testing & Imaging

A. Basic principles
1. Based upon medical history, review of systems & clinical examination
   a) No work-up for first occurrence of isolated anterior uveitis
   b) Focused work-up reflecting diagnostic indicators for recurrent uveitis
2. Rule out infectious disease & masquerade syndromes
   a) Syphilis, herpes virus, Lyme's Disease & toxoplasmosis
   b) Malignancies, retinal detachments & ocular ischemic syndrome
3. Don't give up…take a longitudinal approach (autoimmune disease=evolving course)

B. The tests that you may need to order & interpret
1. Complete blood count (CBC) with differential
2. Metabolic panel
3. Erythrocyte sedimentation rate(ESR) & C-reactive protein (CRP)
4. HLA-B27, lumbosacral spine films, cervical spine films
5. RPR, FTA-ABS

6. Mantoux/PPD, IGRA (QFT-GIT, T-spot), Chest X-ray
7. ACE, serum lysozyme
8. RF, ANA, dsDNA, ssA(Ro), ssB(La), anti-CCP
9. P-ANCA, C-ANCA
10. Antiphospholipid antibodies
11. Titers: lyme, toxoplasmosis, toxocara, cat-scratch
12. CT scan, MRI

C. Developing a strategy with your rheumatologist
   1. Become familiar with the most common diseases present in your demographic
   2. Determine the who, what, when and how often for referral and follow-up

D. Case#4: Ankylosing spondylitis
   1. Optometric exam
      a) Entrance exam
      b) Slit lamp exam
      c) Posterior segment
      d) Diagnosis & Management
   2. Rheumatologic exam
      a) Clinical exam
      b) Management

V. Systemic Management of Anterior Uveitis

A. Co-management with rheumatology
   1. Corticosteroids
      a) Basic pharmacology
      b) Oral prednisone
   2. Nonsteroidal anti-inflammatory drugs (NSAIDs)
      a) Basic pharmacology
      b) Mini-formulary
         1) Ibuprofen (Advil®, Motrin®)
         2) Naproxen (Naprosyn®)
         3) Indomethacin (Indocin®)
   3. DMARDs / Immunosuppressants
      a) Antimetabolites
         1) Methotrexate (Rheumatrex®;Trexall®)
         2) Azathioprine (Imuran®)
      b) Biologic agents
         1) Infliximab (Remicade®)
         2) Adalimumab (Humira®)

B. Case#5: Recurrent Anterior Uveitis & Spondyloarthopathy
   1. Optometric exam
      a) History
      b) Entrance exam
      c) Slit lamp exam
      d) Posterior segment
      e) Diagnosis

f) Management
g) Outcomes
h) Patient advisement

2. Rheumatologic Exam
   a) Clinical Exam
   b) Management

D. Case #6: Is this JIA or SpA?
1. Optometric exam
   a) Entrance exam
   b) Slit lamp exam
   c) Posterior segment
   d) Diagnosis
   e) Management
   f) Complications
   g) Outcomes

VI. Conclusions

A. Co-management with rheumatology
1. The rules have changed
   a) Optimal care of the uveitis patient may require co-management
   b) Working with a rheumatologist
2. When an optometrist & rheumatologist are not enough
   a) Diagnostic surgery
   b) Therapeutic surgery

VII. Bibliography

1. Abbas AK, Lichtman AH. Basic Immunology:Functions and Disorders of the Immune System. Third Edition. Saunders/Elsevier, Philadelphia, PA:2011.
2. Agarwal SK. Biologic agents in rheumatoid arthritis: an update for managed care professionals. J Manag Care Pharm 2011;17(9) Suppl B):S14-18.
3. Ali A, Rosenbaum JT. Use of methotrexate in patients with uveitis. Clin Exp Rheumatol 2010; 28(5 Suppl 61):145-50.
4. Ali A, Samson CM. Seronegative spondyloarthropathies and the eye. Curr Opin Ophthalmol 2007; 18:476-480.
5. Ardoin SP, Kredich D, Rabinovich E, et al. Infliximab to treat chronic noninfectious uveitis in children: retrospective case series with long-term follow-up. Am J Ophthalmol 2007; 144(6):844-849.
6. Atagunduz P, Aydin SZ, Bahadir C, et al. Determinants of early radiographic progression in ankylosing spondylitis. J Rheumatol 2010;37(11):2356-61.
7. Bloch-Michel E, Nussenblatt RB. International Uveitis Study Group recommendations for the evaluation of intraocular inflammatory disease. Am J Ophthalmol 1987;103:234-235.
8. Braakenberg A, de Valk HW, de Boer J, Rothova A. Human leukocyte antigen-B27-associated uveitis: long-term follow-up and gender differences. Ophthalmol 2008;145:472-479.

9. Boyd SR, Young S, Lightman S. Immunopathology of the noninfectious posterior and intermediate uveitides. Surv Ophthalmol 2001; 46(3):209-233.
10. Braun J, Sieper J. Biological therapies in spondyloarthritides-the current state. Rheumatol 2004;43:1072-1084.
11. Brooks P, Hochberg M. Outcome measures and classification criteria for the rheumatic diseases. A compilation of data from OMERACT (Outcome Measures for Arthritis Clinical Trials), ILAR (international League of Associations for Rheumatology), regional leagues and other groups. Rheumatology (Oxford) 2001;40:896-906.
12. Butler NJ, Suhler EB, Rosenbaum JT. Interferon alpha 2b in the treatment of uveitic cystoid macular edema. Ocul Immunol Inflamm 2012; 20(2):86-90.
13. Chan SM, Gan KD, Weis E. Characteristics and predictors of recurrence of anterior and intermediate uveitis in a Canadian referral centre. Can J Ophthalmol 2010;45(2):144-148.
14. Chang JH, McCluskey PJ, Wakefield D. Acute anterior uveitis and HLA-B27. Surv Ophthalmol 2005; 50:364-388.
15. Charkoudian LD, Ying GS, Pujari SS, et al. High dose intravenous corticosteroids for ocular inflammatory disease. Ocul Immunol Inflamm 2012; 20(2):91-99.
16. Chung YM, Liao HT, Lin KC, et al. Prevalence of spondyloarthritis in 504 Chinese patients with HLA-B27-associated acute anterior uveitis. Scand J Rheumatol 2008;1:1-7.
17. Cunningham ET Jr, Wender JD. Practical approach to the use of corticosteroids in patients with uveitis. Can J Ophthalmol 2010;45(4):352-358.
18. Daniel E, Thorne JE, Newcomb CW, et al. Mycophenolate mofetil for ocular inflammation. Am J Ophthalmol 2010;149(3):423-432.
19. Darrel RW, Wagener HP, Kurland LT. Epidemiology of uveitis. Arch Ophthalmol 1962;68:502-515.
20. de Groot-Mijnes JD, de Visser L, Zuurveen S, et al. Identification of new pathogens in the intraocular fluid of patients with uveitis. Am J Ophthalmol 2010; 150(5):628-636.
21. Diaz-Llopis M, Salom D, Garcia-de-Vicuna C, et al. Treatment of refractory uveitis with Adalimumab: a prospective multicenter study of 131 patients. Ophthalmology 2012; Apr 21 (Epub ahead of print).
22. Dodds EM, Holland GN, Stanford MR, et al. Intraocular inflammation associated with ocular toxoplasmosis: relationships at initial examination. Am J Ophthlmol 2008;146:856-865.
23. Durrani K, Zakka FR, Ahmed M, et.al. Systemic therapy with conventional and novel immunomodulatory agents for ocular inflammatory disease. Surv Ophthamol 2011;56:474-510.
24. Elewaut D, Matucci-Cerinic M. Treatment of ankylosing spondylitis and extra-articular manifestations in everyday rheumatology practice. Rheumatology 2009;48(9):1029-1035.
25. Fiorelli Vm, Bhat P, Foster CS. Nonsteroidal anti-inflammatory therapy and recurrent acute anterior uveitis. Ocul Immunol Inflamm 2010; 18:116-120.
26. Foeldvari I, Wierk A. Methotrexate is an effective treatment for chronic uveitis associated with juvenile idiopathic arthritis. J Rheumatol 2005; 32: 362-365.

27. Foster CS. Diagnosis and treatment of juvenile idiopathic arthritis associated uveitis. Curr Opin Ophthalmol 2003;14:395-398.
28. Foster CS, Davanzo R, Flynn TE, et al. Durezol (Difluprednate Ophthalmic Emulsion 0.05%) compared with Pred Forte 1% ophthalmic suspension in the treatment of endogenous anterior uveitis. J Ocul Pharmacol Ther 2010;26(5):475-83.
29. Foster CS, Vitale AT. Diagnosis and Treatment of Uveitis. First edition. WB Saunders, Philadelphia, PA: 2002.
30. Frick KD, Drye LT, Kempen JH, et al. Associations among visual acuity vision- and health-related quality of life among patients in the Multicenter Uveitis Steroid Treatment Trial. Invest Ophthalmol Vis Sci 2012;53(3):1169-1176.
31. Galor A, Feuer W, Kempen JH, et al. Adverse effects of smoking on patients with ocular inflammation. Br J Ophthalmol 2010; 94(7):848-853.
32. Galor A, Jabs DA, Leder HA, et al. Comparison of antimetabolite drugs as corticosteroid-sparing therapy for noninfectious ocular inflammation. Ophthalmology 2008;115:1826-1832.
33. Gangapura S, Newcomb CW, Liesegang TL, et al. Systemic immunosuppressive therapy for eye diseases Chort Study. Methotrexate for ocular inflammatory diseases. Ophthalmology 2009; 116: 2188-2198.
34. Goebel JC, Roesel M, Heinz C, et al. Azathioprine as a treatment option for uveitis in patients with juvenile idiopathic arthritis. Br J Ophthalmol 2011; 95(2):209-213.
35. Gritz, DC, Wong, IG. Incidence and Prevalence of Uveitis in Northern California. Ophthalmology 2004;111:491-500.
36. Grunwald L, Newcomb CW, Daniel E, et al. Risk of relapse in primary acute anterior uveitis. Ophthalmology 2011;118(10):1911-1915.
37. Guly CM, Forrester JV. Investigation and management of uveitis. BMJ 2010;341:821-826.
38. Heinz C, Mingels A, Goebel C, et al. Chronic uveitis in children with and without juvenile idiopathic arthritis: differences in patient characteristics and clinical course. J Rheumatol 2008;35:1403-1407
39. Hoeve M, Kalinina Ayuso V, Schakij-Delfos NE, et al. The clinical course of juvenile idiopathic arthritis-associated uveitis in childhood and puberty. Br J Ophthalmol 2012; 96(6):852-856.
40. Holbrook JT, Kempen JH, Prusakowski NA, et al. Challenges in the design and implementation of the Multicenter Uveitis Steroid Treatment (MUST) Trial—lessons for comparative effectiveness trials. Clin Trials 2011;8(6):736-743.
41. Holland GN, Denove CS, Yu F. Chronic anterior uveitis in children: clinical characteristics and complications. Am J Ophthalmol 2009;147(4):667-678.
42. Holland GN, Steihm ER. Special considerations in the evaluation and management of uveitis in children. Am J Ophthalmol 2003;135:867-878
43. Jabs DA, Nussenblatt RB, Rosenbaum JT. Standardization of uveitis nomenclature for reporting clinical data. Results of the First International Workshop. Am J Ophthalmol 2005; 140:509-516.
44. Jap A, Chee S. Immunosuppressive therapy for ocular diseases. Curr Opin Ophthalmol 2008;19:535-540.

45. Kahn MA. Ann Intern Med 2002;136:896-907.
46. Kakkassery V, Megler S, Pleyer U. Anti-TNF-alpha treatment: a possible promoter in endogenous uveitis? Observational report on six patients: occurrence of uveitis following etanercept treatment. Curr Eye Res 2010; 35(8):751-756.
47. Kalinina Ayuso V, van de Winkel EL, Rothova A, de Boer JH. Relapse rate of uveitis post-methotrexate treatment in juvenile idiopathic arthritis. Am J Ophthalmol 2011;151(2):217-222.
48. Kalinina Ayuso V, Ten Cate HA, van der Does P, et al. Male gender as a risk for complications in uveitis associated with juvenile idiopathic arthritis. Am J Ophthalmol 2010;149(6):994-999.
49. Kempen JH, Altaweel MM, Holbrook JT, et al. Randomized comparison of systemic anti-inflammatory therapy versus fluocinolone acetonide implant for intermediate, posterior, and panuveitis: the multicenter uveitis steroid treatment trial. Ophthalmology 2011;118(10):1916-1926.
50. Kempen JH, Daniel E, Dunn JP, et al. Overall and cancer related mortality among patients with ocular inflammation treated with immunosuprressive drugs: retrospective cohort study. BJM 2009;339:b2480.
51. Kempen JH, Ganesh SK, Sangwan VS, Rathinam SR. Interobserver agreement in grading activity and site of inflammation in eyes of patients with uveitis. Am J Ophthalmol 2008;146(6);813-818.
52. Kesen MR, Setlur V, Goldstein DA. Juvenile idiopathic arthritis-related uveitis. Inter Ophth Clinics 2008;48(3):21-38.
53. Kuno N, Fujii S. Biodegradable intraocular therapies for retinal disorders progress to date. Drugs Aging 2010;27(2):117-134.
54. Larson T, Nussenblatt RB, Sen HN. Emerging drugs for uveitis. Expert Opin Emerg Drugs 2011;16(2):309-322.
55. Levinson RD. Killer immunoglobulin-like receptor genes in uveitis. Ocul Immunol Inflamm 2011;19(3):192-201.
56. Levinson RD, Rosenbaum JT. Ocul Immunol Inflamm 2010;18(2):69-71.
57. Levy-Clarke GA, Nussenblatt RB, Smith JA. Management of chronic pediatric uveitis. Curr Opin Ophthalmol 2005; 16(5):281-288.
58. Linssen A, Meenken C. Outcomes of HLA-B27-positive and HLA-B27-negative acute anterior uveitis. Am J Ophthalmol 1995;120(3):351-361.
59. Lowder C, Belfort R Jr, Lightman S, et al; for the Ozurdex HURON Study Group. Dexamethasone intravitreal implant for noninfectious intermediate or posterior uveitis. Arch Ophthalmol 2011; 129(5):545-553.
60. Luger D, Caspi RR. New perspectives on effector mechanisms in uveitis. Semin Immunopathol 2008;30:135-143.
61. Mandeville JT, Levinson RD, Holland GN. The tubulointerstitial nephritis and uveitis syndrome. Surv Ophthalmol 2001; 46(3): 195-208.
62. Martin TM, Rosenbaum JT. An update on the genetics of HLA B27-associated acute anterior uveitis. Ocul Immunol Inflamm 2011;19(2):108-114.
63. McCannel CA, Holland GN, Helm CJ, et al. Causes of uveitis in the general practice of ophthalmology. Am J Ophthalmol 1996;121:35-46.
64. Monnet D, Breban M, Hudry C, et al. Ophthalmic findings and frequency of extraocular manifestations in patients with HLA-B27 uveitis.

65. Morse HG, Rate RG, Bonnell MD, uberski T. High frequency of HLA-B27 and Reiter's syndrome in Navajo Indians. J Rheumatol 1980; 7(6): 900-902.
66. Munoz-Fernandez S, Garcia-Aparicio AM, Hidalgo MV, et al. Methotrexate: an option for preventing the recurrence of acute anterior uveitis. Eye 2009; 23: 1130-1133.
67. Neri P, Zucchi M, Allegri P, et al. Adalimumab (Humira™): a promising monoclonal antio-tumor necrosis factor alpha in ophthalmology. Int Ophthalmol 2011; 30(3):313-322.
68. Noble J, Hollands H, Forooghian F, et al. Evaluating the cost effectiveness of anterior uveitis investigation by Canadian ophthalmologists. Can J Ophthalmol 2008;43(6):652-657.
69. Nussenblatt RB. Investigation of anterior uveitis. Can J Ophthalmol 2008:43:630-633.
70. Nussenblatt RB. The natural history of uveitis. Int Ophthalmol 1990;14(5-6):303-308.
71. Ossewaarde-van Norel J, Rothova A. Clinical review: update on the treatment of inflammatory macular edema. Ocul Immunol Inflamm 2011;19(1):75-83.
72. Ossewaarde-van Norel J, Berg EM, Sijssens KM, Rothova A. Arch Ophthalmol 2011;129(2):158-162.
73. Ozgocmen S, Ardicoglu O, Kamanli A, et al. Pattern of disease onset, diagnostic delay, and clinical features in juvenile onset and adult onset ankylosing spondylitis. J Rheumatol 2009;36(12):2830-2833.
74. Pacheco PA, Taylor SR, Cuchacovich MT, Diaz GV. Azathioprine in the management of autoimmune uveitis. Ocular Immun Inflamm 2008;16:161-165.
75. Papadia M, Herbort CP. Infliximab-induced demyelination causes visual disturbance mistaken for recurrence of HLA-B27-related uveitis. Ocul Immunol Inflamm 2010;18(6):482-484.
76. Petty RE, Southwood TR, Manners P, et al. International League of Associations for Rheumatology classification of juvenile idiopathic arthritis: second revision, Edmonton 2001. J Rheumatol 2004;31:390-392.
77. Proenca H, Ferreira C, Miranda M, et al. Serum prolactin levels in HLA-B27-associated uveitis. Eur J Ophthalmol 2008;18(6):929-933.
Quinones K, Choi JY, Yilmaz T, et al. Pars plana vitretomy versus immunomodulatory therapy for intermediate uveitis: a prospective, randomized pilot study. Ocul Immunol Inflamm 2010; 18(5):411-417.
78. Rabinovich CE. Use of tumor necrosis factor inhibitors in uveitis. Curr Opin Rheumatol 2007; 19:482-486.
79. Reveille JD. The genetic basis of spondyloarthritis. Ann Rheum Dis 2011; 70 Suppl 1:44-50.
80. Rodriguez A, Calonge M, Pedroza-Seres M, et al. Referral patterns of uveitis in a tertiary eye care center. Arch Ophthalmol 1996 May;114(5):593-9.
81. Roesel M, Gutfleisch M, Heinz C, et al. Orbital floor triamcinolone acetonide injections for the management of active non-infectious uveitis. Eye 2009;23(4):910-914.
82. Rosenbaum JT. An algorithm for the systemic evaluation of patients with uveitis: guidelines for the consultant. Semin Arthritis Rheum 1990;19(4):248-257.

83. Rosenbaum JT. Why HLA-B27? My thirty-year quest:the Friedenwald lecture. J Invest Ophthalmol Vis Sci 2011;52(10):7711-7715.
84. Rosenbaum JT, Russell AS, Guenther LC, El-Gabalawy H. JThe influence of uveitits on patients with immune-mediated inflammatory disease. J Rheumatol Suppl 2011;88:26-30.
85. Rosenbaum JT, Ku J, Ali A, et al. Patients with retinal vasculitis rarely suffer from systemic vasculitis. Semin Arthritis Rheum 2012; 41(6):859-865.
86. Rosenbaum JT. Future for biologic therapy for uveitis. Curr Opin Ophthalmol 2010;21(6):473-477.
87. Rothova A, Buitenhuis HJ, Meenken C, et al. Uveitis and systemic disease. Br J Ophthalmol 1992;76:137-141.
88. Rothova A, de Boer JH, Ten Dam-van Loon NH, et al. Usefulness of acqueous humor analysis for the diagnosis of posterior uveitis. Ophthalmology 2008;115(2):306-311.
89. Rothova A, Suttorp-van Schulten MS, Frits Treffers W, et al. Causes and frequency of blindness in patients with intraocular inflammatory disease. Br J Ophthalmol 1996;80:332-336.
90. Rudwaleit M, van der Heijde D, Landewe R, et al. The Assessment of SpondyloArthritis International Society classification criteria for peripheral spondyloarthritis and for spondyloarthritis in general. Ann Rheum Dis 2011;7(0(1):25-31.
91. Samson CM, Waheed N, Baltatzis S, Foster CS. Methotrexate therapy for chronic noninfectious uveitis: an analysis of a case series of 160 patients. Ophthalmology 2001;108:1134-1139.
92. Schiffman RM, Jacobsen G, Whitcup SM. Visual functioning and general health status in patients with uveitis. Arch Ophthalmol 2001;119(6):841-849.
93. Sfikakis PP. The first decade of biologic TNF antagonists in clinical practice: lessons learned, unresolved issues and future directions. Curr Dir Autoimmun 2010;11:180-210.
94. Siddique SS, Shah R, Suelves AM, Foster CS. Road to remission: a comprehensive review of therapy in uveitis. Expert Opin Investig Drugs 2011;20(11):1497-1515.
95. Smit RL, Baarsma GS, de Vries J. Classification of 750 consecutive uveitis patients in the Rotterdam Eye Hospital. International Ophthalmol 1993;17:71-75.
96. Smith JA, Mackensen F, Sen HN, et al. Epidemiology and course of disease in childhood uveitis. Ophthalmology 2009;116(8);1544-1551.
97. Smith JR, Rosenbaum JT. Management of uveitis. Arthritis Rheum 2002; 46:309-318.
98. Sobrin L, Kim EC, Christen W, et al. Infliximab therapy for the treatment of refractory ocular inflammatory disease. Arch Ophthalmol 2007;125(7):895-900.
99. Sugar EA, Jabs DA, Altweel MM, et al. Identifying a clinically meaningful threshold for change in uveitic macular edema evaluated by optical coherence tomography. Am J Ophthalmol 2011;152(6):1044-1052.
100. Suttorp-Schulten MS, Rothova A. The possible impact of uveitis in blindness: a literature survey. Br J Ophthalmol 1996;80:844-848.

101. Tay-Kearney ML, Schwam BL, Lowder C, et al. Clinical features and associated systemic diseases of HLA-B27 uveitis. Am J Ophthalmol 1996;121:47-56.
102. Taylor SR, Habot-Wilner Z, Pacheco P, Lightman S. Intravitreal methotrexate in uveitis. Ophthalmology 2012;119(4):878-879.
103. Treseler PA, Foulks GN, Sanfilippo F. The expression of HLA antigens by cells in the human cornea. Am J Ophthalmol 1984;98(6):763-772.
104. Tynjala P, KotaniemiK, Latva K, et al. Adalimumab in juvenile idiopathic arthritis-associated chronic anterior uveitis. Rheumatol 2008;47:339-344.
105. Vazquez-Cobian LB, Flynn T, Lehman TJ. Adalimumab therapy for childhood uveitis. J Pediatrics 2006;149:572-575.
106. Vidovic-Valentincic N, Kraut A, Hawlina M, et al. Intermediate uveitis: long-term course and visual outcome. Br J Ophthalmol 2009;93(4):477-480.
107. Walsh B, Yocum DE, Khan MA. Arthritis in Native North American tribes. Curr Opin in Rheum 1998;10:319-325.
108. Wang F, Wang NS. Etanercept therapy-associated acute uveitis: a case report and literature review. Clin Exp Rheumatol 2009;27(5):838-839.
109. Willermain F, Rosenbaum JT, Bodaghi B, et al. Interplay between innate and adaptive immunity in the development of non-infectious uveitis. Prog Retin Eye Res 2012;31(2):182-194.
110. Wright T, Cron RQ. Pediatric rheumatology for the adult rheumatologist II: uveitis in juvenile idiopathic arthritis. J Clin Rheumatol 2007;13:205-210.
111. Yasser R, Yasser E, Hannan D, et al. Enthesitis in seronegative spondyloarthropathies with special attention to the knee joint by MRI: a step forward toward understanding disease pathogenesis. Clin Rheumatol 2010;30(3):312-322.
112. Zaidi AA, Ying GS, Daniel E, et al; Systemic Immunosuppressive Therapy for Eye Diseases Cohort Study. Hypopyon in patients with uveitis. Ophthalmology 2010;117(2):336-372.
113. Zamecki KJ, Jabs DA. HLA typing in uveitis: use and misuse. Am J Ophthalmol 2010;149(2):189-193.