

# Correspondence



## INSTRUCTIONS FOR LETTERS TO THE EDITOR

Editorial comment in the form of a Letter to the Editor is invited. The length of a letter should not exceed 800 words, with a maximum of 10 references and no more than 2 figures or tables; and no subdivision for an abstract, methods, or results. Letters should have no more than 4 authors. Financial associations or other possible conflicts of interest should be disclosed.

Letters should be submitted via our online submission system, available at the Manuscript Central website: <http://mc.manuscriptcentral.com/jrheum> For additional information, contact the Managing Editor, The Journal of Rheumatology, E-mail: [jrheum@jrheum.com](mailto:jrheum@jrheum.com)

## Not Steroids Again

To the Editor:

I have a number of concerns with the editorial by Dr. Pincus, *et al* in the February issue of *The Journal*<sup>1</sup>. Firstly, Dr. Huizinga and his group have shown in an elegant study that methotrexate (MTX) has little influence on the smaller proportion of patients who may progress to rheumatoid arthritis but who have a negative test for anti-cyclic citrullinated peptide (CCP) antibodies<sup>2</sup>. This is a simple test to do; why not use it, rather than persisting in an approach that is unlikely to work? However, at worst this would result in a few patients getting MTX unnecessarily — not a major issue. My big concern is that they appear to be suggesting a return to the truly “bad old days” when family doctors would routinely prescribe steroids (alone) for their rheumatoid patients, and only refer after calamitous deformities develop — assuming the patients did not die of a heart attack beforehand. There is no evidence that steroids, whatever the dose, if given alone have any remittive qualities. I am not impressed by their impact even when given with disease modifying antirheumatic drugs (DMARD). The title clearly advocates steroids alone as an option for this undifferentiated disease. I think this is wrong, but what is worse is that to many family doctors, less skilled at recognizing joint swelling than Dr. Pincus and his colleagues, almost all rheumatoid is “undifferentiated” — at least without the anti-CCP test — and steroids will effectively remove the need for referral.

ANTHONY RUSSELL, FRCPC, Rheumatic Disease Unit, University of Alberta, Edmonton, Alberta, Canada.

## REFERENCES

1. Pincus T, Huizinga TWJ, Yazici Y. N-of-1 trial of low-dose methotrexate and/or prednisolone in lieu of anti-CCP, MRI, or ultrasound, as first option in suspected rheumatoid arthritis? [editorial]. *J Rheumatol* 2007;34:250-2.
2. van Dongen H, van Aken J, Lard LR, et al. Efficacy of methotrexate treatment in patients with probable rheumatoid arthritis: a double-blind, randomized, placebo-controlled trial. *Arthritis Rheum* 2007;56:1424-32.

## Dr. Pincus, *et al* reply

To the Editor:

We thank Dr. Russell for his thoughtful comments, extending his many contributions to the rheumatology community over the years, including comments concerning glucocorticoids for rheumatoid arthritis (RA)<sup>1</sup>. We certainly agree that high doses of glucocorticoids, even at 10 mg per day, which have been reported to be efficacious to retard radiographic progression<sup>2</sup>, are not desirable<sup>3</sup>. We also agree that “steroids alone” are not adequate for longterm treatment of RA<sup>4</sup>, and are disappointed to learn that Dr. Russell believes such an interpretation is possible. However, let us note several areas of respectful disagreement:

1. Despite improved sensitivity of anti-CCP to identify patients with early arthritis who will develop progressive disease, 30%–40% of patients with RA who need aggressive treatment for RA have negative anti-CCP tests<sup>5-7</sup>. Even Dr. Russell’s series concerning progression of palindromic rheumatism to RA indicated that 17% (one in 6 patients) who progressed to RA had a negative anti-CCP test<sup>8</sup>. Therefore, it appears preferable to us that some patients might be “overtreated” with a simple n-of-1 trial over 30–90 days with very low dose prednisone and/or MTX than leaving up to 40% of patients who need treatment to control inflammation untreated because of a negative anti-CCP test.

2. The practice advocated is a limited n-of-1 trial 3–5 mg prednisone or prednisolone per day and/or MTX 10 mg weekly for 30–90 days. In our clinical experience, such a trial is adequate to develop a response in patients with suspected early inflammatory arthritis that might be RA but not yet overt disease. It is noteworthy that no significant differences were seen in efficacy over a range of 2.5 to 15 mg daily doses in a metaanalysis of the efficacy of short-term low-dose prednisolone versus placebo<sup>9</sup>.

3. One reason that an n-of-one trial may be preferable to “a simple” anti-CCP test involves costs. The costs of an anti-CCP test are greater than the costs of the visit to a rheumatologist in the United States. Of course, fewer tests for anti-CCP will not resolve spiraling costs for medical services. Nonetheless, physicians have a responsibility to consider costs in their decisions regarding laboratory testing, imaging procedures, and therapies. In view of availability of excellent but expensive therapies for RA at this time, the need for which can be identified clinically in almost all patients (without any laboratory tests), it appears unfortunate to add to the decision process a test that gives a “false-negative” result in one-third of patients.

4. The published results noted by Dr. Russell concerning the absence of significant efficacy of MTX in patients with a negative anti-CCP test<sup>10</sup> were collected over one year, and may not necessarily apply over 5 years. The data presented a subanalysis of a study that included 55 patients who took MTX versus 55 who took placebo. Of the 55 patients treated with MTX, 43 patients who were negative for anti-CCP did not differ in responses to MTX compared to 43 anti-CCP-negative patients treated with placebo. However, in our view, the rate of joint damage in this subgroup was too low to expect differences between the 2 groups. If the patients were followed longer, e.g., 5 years, one may well see differences between the MTX and placebo groups in CCP-negative patients.

One interesting example of differences between one-year and 5-year results can be seen in a metaanalysis published in 1990, in which clinical trial data indicated similar efficacy of injectable gold salts, azathioprine, penicillamine, and MTX over one year<sup>11</sup>. The proportion of patients who continued each agent over one year for the first DMARD also was similar for all agents over one year in clinical practice, comparable to the meta-analysis. However, MTX courses were continued significantly longer than those of the other agents over 5 years<sup>12</sup>, suggesting greater efficacy of MTX, as confirmed in later developments<sup>13,14</sup>.

5. We agree that “a few patients getting MTX unnecessarily is not a major issue,” as Dr. Russell suggests. However, we prefer to err on the side of treatment that has minimal toxicity<sup>13,14</sup> rather than allow inflammation to potentially progress in patients with possible RA. This approach is consistent with a principle of “tight control” in hypertension and hyperlipi-

demia<sup>15-17</sup>, in which many patients may be treated with relatively safe therapies who may not require these treatments. Ironically, 30–90 days of very low-dose prednisone and/or MTX appears to have lower toxicity than almost any medication for hypertension or hyperlipidemia.

6. We also agree that referral of patients with early arthritis to rheumatologists as soon as possible provides the best possible care. However, this ideal procedure is not present in most locales all over the world. A profound shortage of rheumatologists already exists in many areas, and will likely increase substantially over the coming years<sup>15,18,19</sup>.

The case for low-dose prednisone for patients with RA has been made by others<sup>9,20-23</sup>, including 2 recently reported clinical trials<sup>24,25</sup> and 2 eloquent more recent editorials in *The Journal*<sup>26,27</sup>, although disagreement remains respectfully recognized<sup>28-30</sup>. A randomized trial over 5–10 years with particular attention to adverse events, which would be regarded as ethical in view of the absence of consensus, would appear desirable.

None of these comments reduces the importance of further research concerning anti-CCP to increase understanding of pathogenesis and treatment of RA, such as new information concerning the influence of associations with HLA class II in its severity, although limitations of anti-CCP in clinical care are recognized by others<sup>7,31,32</sup>. Rheumatologists might recognize whether some information that is very useful in research settings may not necessarily have value in clinical decisions, and even lead to possibly incorrect conclusions in many patients.

THEODORE PINCUS, MD, Vanderbilt University, Nashville, Tennessee, USA; TOM W.J. HUIZINGA, MD, PhD, Leiden University Medical Center, Leiden, The Netherlands; YUSUF YAZICI, MD, New York University Hospital for Joint Diseases, New York, New York, USA.

## REFERENCES

1. Ramos-Remus C, Sibley J, Russell AS. Steroids in RA: the honeymoon revisited. *J Rheumatol* 1992;19:667-70.
2. van Everdingen AA, Jacobs JWJ, van Reesema DRS, Bijlsma JWJ. Low-dose prednisone therapy for patients with early active rheumatoid arthritis: clinical efficacy, disease-modifying properties, and side effects. *Ann Intern Med* 2002;136:1-12.
3. Pincus T, Sokka T, Stein CM. Are long-term very low doses of prednisone for patients with rheumatoid arthritis as helpful as high doses are harmful? *Ann Intern Med* 2002;136:76-8.
4. Stein CM, Pincus T. Glucocorticoids. In: Ruddy S, Harris ED Jr, Sledge CB, editors. *Textbook of rheumatology*. Philadelphia: W.B. Saunders Company; 2001:823-40.
5. van Gaalen FA, Visser H, Huizinga TWJ. A comparison of the diagnostic accuracy and prognostic value of the first- and second anti-cyclic citrullinated peptides autoantibody (CCP1 and CCP2) tests for rheumatoid arthritis. *Ann Rheum Dis* 2005;64:1510-2.
6. Huizinga TWJ, Machold KP, Breedveld FC, Lipsky PE, Smolen JS. Criteria for early rheumatoid arthritis. From Bayes' Law revisited to new thoughts on pathogenesis. *Arthritis Rheum* 2002;46:1155-9.
7. Riedemann JP, Muñoz S, Kavanaugh A. The use of second generation anti-CCP antibody (anti-CCP2) testing in rheumatoid arthritis — a systematic review. *Clin Exp Rheumatol* 2005; 23:S69-S76.
8. Maksymowych WP, Suarez-Almazor ME, Buenviaje H, Cooper BL, Degeus C, Thompson M, Russell AS. HLA and cytokine gene polymorphisms in relation to occurrence of palindromic rheumatism and its progression to rheumatoid arthritis. *J Rheumatol* 2002;29:2319-26.
9. Gotzsche PC, Johansen HK. Meta-analysis of short term low dose prednisolone versus placebo and non-steroidal anti-inflammatory drugs in rheumatoid arthritis. *BMJ* 1998;316:811-8.
10. van Dongen H, van Aken J, Lard LR, et al. Efficacy of methotrexate treatment in patients with probable rheumatoid arthritis: A double-blind, randomized, placebo-controlled trial. *Arthritis Rheum* 2007;56:1424-32.
11. Felson DT, Anderson JJ, Meenan RF. The comparative efficacy and toxicity of second-line drugs in rheumatoid arthritis: results of two meta-analyses. *Arthritis Rheum* 1990;33:1449-61.
12. Pincus T, Marcum SB, Callahan LF. Long-term drug therapy for rheumatoid arthritis in seven rheumatology private practices: II. Second-line drugs and prednisone. *J Rheumatol* 1992;19:1885-94.
13. Yazici Y, Erkan D, Paget SA. Monitoring methotrexate hepatic toxicity in rheumatoid arthritis: is it time to update the guidelines? *J Rheumatol* 2002;29:1586-9.
14. Yazici Y, Sokka T, Kautiainen H, Swearingen C, Kulman I, Pincus T. Long term safety of methotrexate in routine clinical care: discontinuation is unusual and rarely the result of laboratory abnormalities. *Ann Rheum Dis* 2005;64:207-11.
15. Pincus T, Gibofsky A, Weinblatt ME. Urgent care and tight control of rheumatoid arthritis as in diabetes and hypertension: better treatments but a shortage of rheumatologists. *Arthritis Rheum* 2002;46:851-4.
16. Grigor C, Capell H, Stirling A, et al. Effect of a treatment strategy of tight control for rheumatoid arthritis (the TICORA study): a single-blind randomised controlled trial. *Lancet* 2004;364:263-9.
17. Goekoop-Ruiterman YPM, de Vries-Bouwstra JK, Allaart CF, et al. Clinical and radiographic outcomes of four different treatment strategies in patients with early rheumatoid arthritis (the BeSt study): a randomized, controlled trial. *Arthritis Rheum* 2005;52:3381-90.
18. Birnbaum N. American College of Rheumatology response to the 2006 rheumatology workforce study. *Arthritis Rheum* 2007; 56:730-1.
19. Deal CL, Hooker R, Harrington T, et al. The United States rheumatology workforce: supply and demand 2005-2025. *Arthritis Rheum* 2007;56:722-9.
20. Conn DL. Resolved: low-dose prednisone is indicated as a standard treatment in patients with rheumatoid arthritis. *Arthritis Rheum* 2001;45:462-7.
21. Harris ED Jr. Prednisolone in early rheumatoid arthritis: an antiinvasive effect. *Arthritis Rheum* 2005;52:3324-5.
22. Boers M. The case for corticosteroids in the treatment of early rheumatoid arthritis. *Rheumatology Oxford* 1999;38:95-7.
23. Kirwan J, Boers M. Low dose prednisolone for treatment of RA. *Ann Rheum Dis* 2004;63:1533-4.
24. Svensson B, Boonen A, Albertsson K, van der Heijde D, Keller C, Hafstrom I. Low-dose prednisolone in addition to the initial disease-modifying antirheumatic drug in patients with early active rheumatoid arthritis reduces joint destruction and increases the remission rate: a two-year randomized trial. *Arthritis Rheum* 2005;52:3360-70.
25. Wassenberg S, Rau R, Steinfeld P, Zeidler H. Very low-dose prednisolone in early rheumatoid arthritis retards radiographic progression over two years: a multicenter, double-blind, placebo-controlled trial. *Arthritis Rheum* 2005;52:3371-80.
26. Carette S. All patients with rheumatoid arthritis should receive corticosteroids as part of their management. *J Rheumatol* 2007;34:656-60.
27. Boers M. Studying the benefit/risk ratio of glucocorticoids in rheumatoid arthritis. *J Rheumatol* 2007;34:661-3.
28. Caplan L, Wolfe F, Russell AS, Michaud K. Corticosteroid use in rheumatoid arthritis: prevalence, predictors, correlates, and outcomes. *J Rheumatol* 2007;34:696-705.
29. Morrison E, Capell HA. Corticosteroids in rheumatoid arthritis — the case against. *Rheumatology Oxford* 1999;38:97-100.
30. Saag KG. Resolved: low-dose glucocorticoids are neither safe nor effective for the long-term treatment of rheumatoid arthritis. *Arthritis Rheum* 2001;45:468-71.
31. Cantaert T, De Rycke L, Bongartz T, et al. Citrullinated proteins in rheumatoid arthritis: crucial...but not sufficient! *Arthritis Rheum* 2006;54:3381-9.
32. Bell DA. Can we rely on anti-citrulline antibody determination for the diagnosis of early rheumatoid arthritis? *J Rheumatol* 2007;33:2369-71.



## Antiperinuclear Factor Test Is More Useful than Anti-Sa Assay When Used with Anti-Cyclic Citrullinated Peptide Test in Diagnosis of Rheumatoid Arthritis

To the Editor:

We read with interest the article by Lopez-Longo, *et al* regarding anti-cyclic citrullinated peptide (anti-CCP) versus anti-Sa antibodies in diagnosis of rheumatoid arthritis (RA)<sup>1</sup>. The authors insisted that the sensitivity of the anti-Sa test (43.6%) is lower than that of the anti-CCP test (72.4%), but since 12% of patients with RA showed anti-CCP test negatives with anti-Sa test positives, performing the anti-Sa test in RA patients with anti-CCP-negative results can aid in the diagnosis of patients with RA. Instead of the anti-Sa, we used the antiperinuclear factor (APF) test simultaneously with the anti-CCP test and found interesting results.

We analyzed the results of patients from the outpatient clinic of Hanyang University Hospital for Rheumatic Diseases who underwent both tests. The disease distributions of patients were as follows: 56 patients with RA, 65 with non-RA connective tissue diseases, and 139 with osteoarthritis. APF test was performed by the indirect immunofluorescent method using a commercial kit (IT-APF<sup>TM</sup>; ImmunoThink Co., Seoul, Republic of Korea). The anti-CCP test was referred to a commercial reference laboratory, and a second-generation enzyme immunoassay kit was used (DiaSTAT<sup>TM</sup> Anti-CCP; Axis-Shield Diagnostics Limited, Dundee, UK). Each test was performed such that the result of the other test is not known. In addition, a comprehensive autoimmune antibody screening test, the "autoimmune target" (AIT) test, was performed using an indirect immunofluorescent test kit (IT-AIT<sup>TM</sup>; ImmunoThink Co.).

Sensitivity, specificity, positive and negative predictive values, and positive and negative likelihood ratio for each test are shown in Table 1. Although there were no big differences between the 2 tests, the sensitivity was higher in the anti-CCP test, while the specificity and predictive value were similar. The likelihood ratios for positive findings were also similar — 8.30 and 7.69, respectively. If we define positives as cases in which both tests are positive, specificity increases to 98.5% and the likelihood ratio for positive findings increases to 38.86, suggesting significant usefulness in the diagnosis of RA. Cases showing discrepant results between the 2 tests are shown in Table 2. The concordance rate of the 2 tests was 82.7%, while the kappa value, the barometer of concordance rate, was 0.498 ( $p < 0.01$ ). In 15 RA patients with negative anti-CCP test results, 6 patients (40%) were positive in the APF test.

The APF test was essential in the diagnosis of RA for a long time, but since then, various problems regarding commercialization of the test led to only limited use in certain specialized rheumatic disease laboratories. In Korea, however, a commercial APF kit was developed to be readily used in the general laboratory<sup>2</sup>, and it is actively in use with the approval of the Korean Food and Drug Administration for *in vitro* diagnostic purposes. In addition, the external quality control program is adopted under the supervision of the Korean Society for Laboratory Medicine to standardize the test<sup>3</sup>. The anti-CCP test was developed as an enzyme immunoassay method using the recombinant peptide that is similar with part of the APF target antigen. The early first-generation kit showed a low sensitivity rate, around 50%, but the current second-generation kit shows an improved average sensitivity rate of 70%<sup>4</sup>. As a consequence, use of the anti-CCP test is growing worldwide, and some researchers have insisted that the anti-CCP test can

Table 1. Diagnostic performance of antiperinuclear factor (APF) test and anti-cyclic citrullinated peptide (anti-CCP) test for the diagnosis of RA.

	APF	Anti-CCP	APF and Anti-CCP
Sensitivity (%)	67.9	73.2	57.1
Specificity (%)	91.2	91.2	98.5
Positive predictive value (%)	67.9	69.5	91.4
Negative predictive value (%)	91.2	92.5	89.3
Positive likelihood ratio	7.69	8.30	38.9
Negative likelihood ratio	0.35	0.29	0.43

Table 2. Discrepancy between antiperinuclear factor (APF) test and anti-cyclic citrullinated peptide (anti-CCP) test results in patients with RA.

	Positive Anti-CCP	Negative Anti-CCP	Total, n (%)
Positive APF, n (%)	32 (57.1)	6 (10.7)	38 (67.8)
Negative APF, n (%)	9 (16.1)	9 (16.1)	18 (32.2)
Total, n (%)	41 (73.2)	15 (26.8)	56

replace the APF test<sup>5</sup>. However, according to the results of this study, these 2 tests are in a complementary relationship, and since 40% of those patients with clinically suspected RA who were negative for the anti-CCP test showed positive APF test results, replacing the APF test by the anti-CCP test would be inappropriate. On the other hand, 33% of those patients with RA who were negative for both tests showed positive results in the AIT test, and we think it would be diagnostically helpful when the AIT test is performed upon those patients who are clinically suspected of RA.

The AIT test is a comprehensive autoimmune antibody screening test, using macrophage cell line (IT-1 cell) as substrate for the antinuclear antibody (ANA) test. The AIT test is more reliable and more easily interpreted than the ANA test performed with the customary HEp-2 cell line<sup>6</sup>. In addition, the AIT test can detect anti-MTOC and anti-GiM, which are the marker antibodies for RA<sup>7,8</sup>.

DUCK-AN KIM, MD; LA-HE JEARN, MD; THINK-YOU KIM, MD, Department of Early Arthritis, Hospital for Rheumatic Diseases, Hanyang University Medical Center, Seoul, Republic of Korea. Address reprint requests to Dr. Kim. E-mail: dukim@hanyang.ac.kr

### REFERENCES

- Lopez-Longo FJ, Rodriguez-Mahou M, Sanchez-Ramon S, et al. Anti-cyclic citrullinated peptide versus anti-Sa antibodies in diagnosis of rheumatoid arthritis in an outpatient clinic for connective tissue disease and spondyloarthritis. *J Rheumatol* 2006;33:1476-81.
- Kim SG, Jung KY, Suh HS, et al. Is it feasible to adopt a commercialized APF kit (IT-APF<sup>TM</sup>) as a routine diagnostic tool for rheumatoid arthritis? [abstract]. *Arthritis Rheum* 2001;44 Suppl:S364.
- Kim TY. An external quality assurance program for autoimmune tests. *Kor J Lab Med* 2006;26:S350-2.
- Avouac J, Gossec L, Dougados M. Diagnostic and predictive value of anti-cyclic citrullinated protein antibodies in rheumatoid arthritis: A systematic literature review. *Ann Rheum Dis* 2006;65:845-51.
- Grootenboer M, Nicaise R, Delaunay E, Meyer O, Chollet M, Labarre E. Second generation anti-cyclic citrullinated peptide (anti-

CCP2) antibodies can replace other anti-filaggrin antibodies and improve rheumatoid arthritis diagnosis. *Scand J Rheum* 2004;33:218-20.

6. Kim TY, Chang SY, Kim SY. A new substrate (IT-1) for the antinuclear antibody (ANA) test [abstract]. *Arthritis Rheum* 1994;37 Suppl:S317.
7. Kim TY, Chang SY, Kim SY. New autoantibodies (anti-MTOC) detected by macrophage cell line (IT-1) in rheumatoid arthritis [abstract]. *Arthritis Rheum* 1995;38 Suppl:S255.
8. Kim TY, Chun LH. A new autoantibody (anti-GiM) in rheumatoid arthritis [abstract]. *Arthritis Rheum* 2000;43 Suppl:S186.

## Duration of Treatment After Eye Involvement in Giant Cell Arteritis

*To the Editor:*

Patients and physicians would like to know the duration of treatment required for giant cell arteritis (GCA). It is not always possible to accurately estimate how long treatment will be required. There is some histopathological evidence that the presence of eye manifestations in GCA is associated with more advanced disease<sup>1</sup>. Loss of vision in GCA may be due to ischemic optic neuropathy, central retinal artery occlusion, choroidal ischemia, or stroke. Other ophthalmic complications include double vision with extraocular muscle ischemia, ischemic ocular motor nerve palsy, ocular ischemic syndrome, hypotony, and Horner's syndrome<sup>2-4</sup>.

We investigated whether the presence of eye involvement significantly lengthens the duration of steroid therapy. We conducted a retrospective study of 30 patients with biopsy-proven GCA between 1995 and 2004 at Southend University Hospital. We compared the duration of treatment for patients with and without eye involvement. The study was approved by South Essex Research Ethics Committee.

All patients followed the same treatment protocol; however, individual patient regimes were formulated depending on clinical presentation, severity of symptoms, patient response to treatment, and the development of side effects. An initial single daily dose of 40–80 mg prednisolone was given for 2 to 4 weeks, then gradually reduced every 2 to 4 weeks by no more than

10% of the total daily dose. Regular assessment of clinical symptoms, erythrocyte sedimentation rate, and C-reactive protein was used to monitor the patient response. Once patients were taking a lower dose of prednisolone, monitoring was reduced to every 6 to 8 weeks and the prednisolone was tapered toward the lowest required dose or stopped. In addition, all patients received calcium and vitamin D supplements.

Of 30 patients with GCA, 16 patients had serious eye involvement. Of these, 15 had anterior ischemic optic neuropathy and one patient had a fourth cranial nerve palsy. The mean duration of treatment in patients with eye involvement (25.69 mo ± 12.80) was significantly longer than in those without eye involvement (11.2 mo ± 3.25; T test  $p = 0.0018$ ; Table 1).

It is probable that the presence of eye involvement in GCA determined the need for longer corticosteroid therapy. In practice, a physician can better estimate the length of treatment period required depending on the presence or absence of eye involvement.

Larger studies could better show the exact value of this prediction.

KAYVAN ARASHVAND, MD, MRCP<sup>ophth</sup>, Senior House Officer in Ophthalmology; WILLIAM LESLIE ALEXANDER, FRCS, FRCO<sup>phth</sup>, Consultant Ophthalmic Surgeon, Eye Unit; BHASKAR DASGUPTA, MD, FRCP, Consultant Rheumatologist, Honorary Professor, Department of Rheumatology, Southend University Hospital NHS Foundation Trust, Prittlewell Chase, Westcliff-on-Sea, Essex, United Kingdom, SS0 0RY. Address reprint requests to Dr. Arashvand. E-mail: k\_arashvand@yahoo.com

## REFERENCES

1. Diaz VA, DeBroff BM, Sinard J. Comparison of histopathologic features, clinical symptoms, and erythrocyte sedimentation rates in biopsy-positive temporal arteritis. *Ophthalmology* 2005;112:1293-8.
2. Galetta SL. Vasculitis. In: Miller NR, Newman NJ, editors. *Walsh and Hoyt's clinical neuro-ophthalmology*. 5th ed. Vol. 3. Baltimore: Williams & Wilkins; 1998:3725-886.
3. Hamed LM, Guy JR, Moster ML, Bosley T. Giant cell arteritis in the ocular ischemic syndrome. *Am J Ophthalmol* 1992;113:702-5.
4. Dimant J, Grob D, Brunner NG. Ophthalmoplegia, ptosis, and miosis in temporal arteritis. *Neurology* 1980;30:1054-8.

Table 1. Demographic characteristics of patients with giant cell arteritis.

	Total Population	With Eye Involvement Total (including all forms of eye involvement)	Unilateral Anterior Ischemic Optic Neuropathy	Without Eye Involvement Bilateral Anterior Ischemic Optic Neuropathy	4th Nerve Palsy	Without Eye Involvement
No.	30	16	12	3	1	14
Sex						
Male	9	5	4	0	1	4
Female	21	11	8	3	0	10
Age, mean ± SD, yrs	76.40 ± 7.26	79.68 ± 5.89	—	—	—	74.86 ± 7.84
Mean duration of treatment ± SD, mo	19.37 ± 10.39	25.69 ± 12.80	—	—	—	11.2 ± 3.25

## Granulomatous Nephritis Associated with R334Q Mutation in NOD2

*To the Editor:*

Pediatric granulomatous arthritis (PGA) is an autosomic-dominant disease characterized by a triad of granulomatous arthritis, uveitis, and dermatitis<sup>1</sup>. The diagnosis rests on the finding of noncaseating giant cell granulomas in

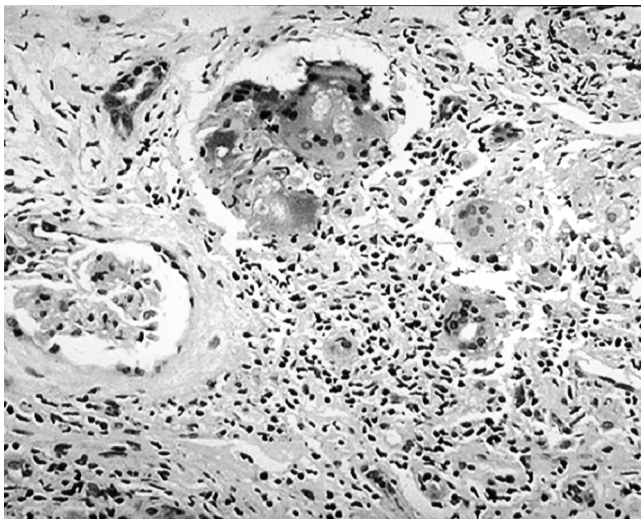
synovium, conjunctiva, or dermis<sup>1,2</sup>. The disease can be familial (Blau syndrome) or sporadic (early onset sarcoidosis) and in both cases is associated with a mutation in or in the vicinity of the NACHT domain of NOD2, a protein involved in nuclear factor- $\kappa$ B and caspase activation<sup>3</sup>.

An expanded phenotype involving diverse organs was recognized before the mutation was described<sup>1,4,5</sup>. However, some of those manifestations are now emerging among patients with documented mutations<sup>6</sup>, as

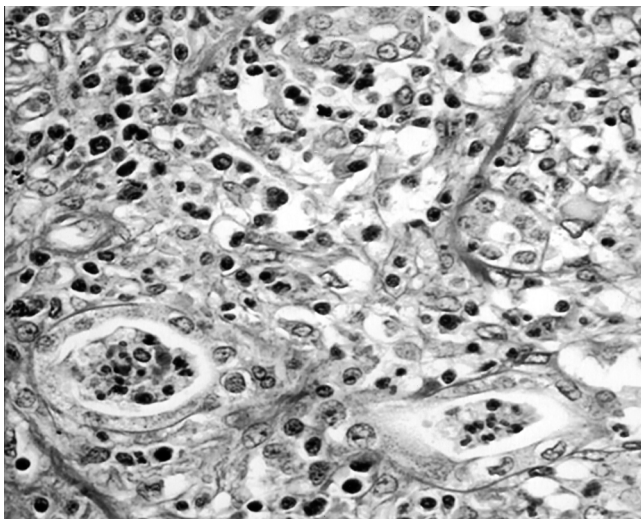
Table 1. Laboratory findings.

	Onset	Infliximab Infusions	
		First**	Last (4th)
Hemoglobin (g %)	9*	11.9	12.2
White blood cells ( $\times 10^3/\text{mm}^3$ )	12	6.6	7.5
Platelets ( $\times 10^3/\text{mm}^3$ )	269	235	321
Sedimentation rate (mm/h)	68	28	28
Creatinine (mg/l)	4	13.9	9
Urine protein (g/24 h)	ND	6	0
Creatinine clearance (ml/min)	ND	47	70

ND: not done. \* Normocytic normochromic. \*\* 15 days before first infusion.



A



B

Figure 1. Pathologic changes in kidney (original magnification  $\times 40$ ). A. Central granulomatous lesions in glomeruli, chronic interstitial infiltrate, and fibrosis (Pas Shiff technique). B. Interstitial fibrosis, tubules with atrophy, and epithelial degeneration, and hyaline and white cell casts (Masson trichromic).

shown by the experience with the International Registry of Pediatric Granulomatous Arthritis (2005).

We describe the first case of interstitial and glomerular granulomatous nephritis in a patient with arginine to glutamine substitution in position 334 (R334Q) of *NOD2*.

A 4-year-old Caucasian girl presented symmetrical polyarthritis of wrists, hips, knees, and ankles as well as intermittent nonspecific fever. There was thickening of the synovium and prominent tenosynovitis. Over the next 2 years she developed a maculopapular, evanescent, and at times urticarial exanthema in trunk and upper extremities histologically corresponding to a nongranulomatous leukocytoclastic vasculitis. Initial routine laboratory assessments are given in Table 1. Antinuclear antibodies and rheumatoid factor were negative. Knee and hand radiographs showed peri-articular osteopenia.

At the age of 8, she developed an asymptomatic nongranulomatous bilateral anterior uveitis with vitreous involvement. Flares associated with red eye led to posterior synechiae, and subsequent visual impairment (OD 9/10, OS 5/10). At age 9 she presented a worsening dermatitis, arthritis, fever, mild pericarditis, and splenomegaly. She received corticosteroids and methotrexate for articular disease, but corticosteroid dependency ensued. Etanercept was introduced, with marginal response.

At age 10 she developed leukocyturia, granular casts, raised serum creatinine 13.9 mg/l (3–7 mg/l), creatinine clearance of 34 ml/min, proteinuria (1 g/24 h), and elevated urinary  $\beta_2$ -microglobulin at 5.63  $\mu\text{g}/\text{ml}$  (1.01–1.73  $\mu\text{g}/\text{ml}$ ). The angiotensin-converting enzyme level was normal at 18 IU/l. Her erythrocyte sedimentation rate was elevated to 98 mm/h.

A percutaneous renal biopsy showed central granulomatous lesions constituted by epithelioid cells, multinucleated giant cells, and lymphocytes in 3 of 9 glomeruli. Fibrosis in Bowman's space was found in 2 glomeruli and fibroepithelial crescents were observed in 2. There were interstitial granulomas with severe fibrosis and infiltrating lymphocytes, histiocytes, neutrophils, and eosinophils. There was no vascular damage. Tubules presented atrophy and dilated morphology with epithelial degeneration and hyaline and white cell casts (Figure 1). Infliximab therapy (3 mg/kg/dose, every 8 wks) was instituted, with excellent response in renal function and arthritis, starting with the fourth infusion (Table 1). Genotyping of *NOD2* revealed a R334Q substitution confirming the diagnosis of PGA.

PGA is the name recently proposed to encompass the familial and sporadic forms of early onset arthritis, with uveitis and dermatitis (usually below age 5 yrs), associated with mutations at the NACHT domain of *NOD2*<sup>6</sup>. Renal involvement has been reported infrequently in this disease, yet at the time of the diagnosis or later during the course of the disease, mainly as interstitial granulomatous nephritis. However, these reports preceded the availability of genetic testing, hence the presence of *NOD2* mutations could not be documented.

Ting, *et al* were the first to document a family with Blau phenotype, in which the mother of the proband developed acute nephritis at age 27 years. The renal biopsy showed interstitial involvement including giant cell granuloma and glomerulosclerosis resulting in significant renal impairment<sup>7</sup>.

In the French series of Coutant, *et al*, 11 children with sarcoid nephritis were reported<sup>8</sup>, but the authors do not differentiate between adult and childhood forms (PGA). It should be noted that 3 patients presented arthritic symptoms, suggesting the possibility of PGA, although the adult form can rarely be associated with arthritis as well. Also 7/11 patients had uveitis.

Between 10% and 50% of patients with PGA phenotype are not associated with identified mutations in the *NOD2* gene<sup>9,10</sup>. Hence the importance of the current report in which we document the first case of a young girl with classical PGA carrying a mutated form of *NOD2* (R334Q), who developed a rather significant form of granulomatous nephritis leading to renal impairment. Thus, granulomatous nephritis becomes an established component of disease phenotype. This adds to the growing evidence supporting an expanded phenotype for PGA, a disease for which a mutation in *NOD2* has been well documented in the literature, and also alerts the clini-

cian on the need to watch for sudden development of internal organ involvement. Although the term PGA was recently suggested by the authors<sup>6</sup>, the expansion of the phenotype suggested by our report may call for the substitution of the word "systemic" to reflect the newly documented clinical manifestations.

SILVIA MÓNICA MEIORIN, MD; GRACIELA ESPADA, MD, Department of Rheumatology; CHRISTIAN ELIAS COSTA, MD, Department of Ophthalmology; ALEJANDRA TARTARA, MD; ELENA DE MATTEO, MD, Hospital de Niños Ricardo Gutierrez, Buenos Aires, Argentina; CARINE WOUTERS, MD, University Hospital Gasthuisberg, Leuven, Belgium; TAMMY M. MARTIN, MD, Casey Eye Institute, Oregon Health and Science University, Portland, Oregon; CARLOS D. ROSE, MD, Thomas Jefferson University, Department of Pediatrics, Wilmington, Delaware, USA. Address reprint requests to Dr. S. Meiorin, Department of Rheumatology, Hospital de Niños Ricardo Gutierrez, Gallo 1330 Pabellón L, Buenos Aires 1425, Argentina. E-mail: smeiorin@hotmail.com

#### REFERENCES

1. Blau EB. Familial granulomatous arthritis, iritis, and rash. *J Pediatr* 1985;107:689-93.
2. Jabs DA, Houk JL, Bias WB, Arnett FC. Familial granulomatous synovitis, uveitis, and cranial neuropathies. *Am J Med* 1985;78:801-4.
3. Miceli-Richard C, Lesage S, Rybojad M, et al. CARD15 mutations in Blau syndrome. *Nat Genet* 2001;29:19-20.
4. Saini SK, Rosé CD. Liver involvement in familial granulomatous arthritis (Blau syndrome). *J Rheumatol* 1996;23:396-9.
5. Rotenstein D, Gibbas DL, Majmudar B, Chastain EA. Familial granulomatous arteritis and polyarthritis of juvenile onset. *New Engl J Med* 1982;306:86-90.
6. Rose CD, Wouters CH, Meiorin S, et al. Pediatric granulomatous arthritis. An international registry. *Arthritis Rheum* 2006;54:3337-44.
7. Ting SS, Ziegler J, Fischer E. Familial granulomatous arthritis (Blau syndrome) with granulomatous renal lesions. *J Pediatr* 1998;133:450-2.
8. Coutant R, Leroy B, Niaudet P, et al. Renal granulomatous sarcoidosis in childhood: a report of 11 cases and a review of the literature. *Eur J Pediatr* 1999;158:154-9.
9. Wang X, Kuivaniemi H, Bonavita G, et al. CARD15 mutations in familial granulomatous syndromes: a study of the original Blau syndrome kindred and other families with large-vessel arteritis and cranial neuropathy. *Arthritis Rheum* 2002;46:3041-5.
10. Kanazawa N, Okafuji I, Kambe N, et al. Early-onset sarcoidosis and CARD15 mutations with consecutive nuclear factor κB activation: common genetic etiology with Blau syndrome. *Blood* 2005;105:1195-7.

---

## Correction

Mancarella L, Bobbio-Pallavicini F, Ceccarelli F, et al. Good clinical response, remission, and predictors of remission in rheumatoid arthritis patients treated with tumor necrosis factor-α blockers: The GISEA study. *J Rheumatol* 2007;34:1670-3. Two authors should be identified as follows: S. Bombardieri, MD, Professor, Rheumatic Disease Unit, University of Pisa; R. Giacomelli, MD, Professor, Rheumatic Disease Unit, University of L'Aquila. We regret the error.