
The Bowman Gray

School of Medicine

Department of Medicine
Section on Rheumatology

Robert A. Turner, M.D., Section Head
Professor of Medicine
(919) 748-4209

July 11, 1988

Mr. Perry A. Chapdelaine, Sr.
Executive Director/Secretary
The Rheumatoid Disease Foundation
Route 4, Box 137
Franklin, TN 37064

Dear Mr. Chapdelaine:

This letter is to thank you for your letter of 3-27-88 and provide a final written report to the Foundation concerning our double-blind placebo controlled study of Clotrimazole in the treatment of rheumatoid arthritis. Also enclosed is a copy of Dr. Dennison's abstract presented at the ARA meeting in Houston for which the reference is Arthritis Rheum 31:S53, 1988. I am sending copies of these documents to Dr. Paul Pybus, Dr. Bradley Wells, Mr. Paul Spikerman, and Dr. J. Kiffin Penry, and I want to thank everyone concerned for their support, professionalism, and forbearance in allowing us to work through the data concerning this interesting study. I certainly plan to keep everyone concerned informed should further publications arise from this worthwhile study, but I wanted your group to have the more detailed data than was available in the abstract as a final written report and am therefore sending this to you at this time. I should mention that Dr. John Simoons is interested in receiving this data, but I have been reluctant to send him data other than that which is published, and therefore in the public domain, because of your letter of 1-2-86 asking that I refrain from communicating such data with him. I will of course be happy to communicate the data to him or will be happy for you to do so if you and the Foundation feel such communications are now in order.

Thank you again for your professionalism in handling all aspects of the study.

Mr. Perry A. Chapdelaine, Sr.

Page 2

July 11, 1988

I will look forward to further communications concerning areas of mutual interest.

Yours truly,



Robert Turner, M.D.

RT/mam

Enclosure

cc: Dr. Bradley Wells - Biostatistician, Research & Prevention Biometry
Mr. Paul Spiekerman - Miles Pharmaceutical
Dr. J. Kiffin Penry - Chairman, Clinical Research Practices Committee
Dr. Paul K. Pybus - Chief Medical Advisor, Rheumatoid Disease Foundation
Dr. William Dennison

CORTICOSTEROIDS IMPAIR LYMPHOCYTE RESPONSES IN PATIENTS FOLLOWING IN VIVO CORTICOSTEROIDS. MR Podgorsek, ND Hall, RJ Flower, PJ Maddison. Bath Arthritis Research Group, Bath, Bath, UK.

Corticosteroids (CS) exert profound effects on lymphocytes, and the formation of specific proteins (lipocortins) which inhibit interleukin-2 (IL-2). We previously found a strong association between anti-lipocortin antibodies (ALA) and high dose oral CS in RA.

To determine whether ALA are functionally important, we studied the immunomodulatory effects on lymphocytes in vivo in response to a challenge in RA patients exhibiting high or normal ALA. The two groups were matched for age, duration, severity and disease activity (P/T) index, and RF levels. Peripheral blood lymphocyte (PBL) phenotypes were assessed before and after CS infusion, using standard flow cytometric separation and monoclonal antibody immunofluorescence.

RA patients with normal ALA showed a marked reduction of total T cells ($11 \times 10^9/L$ before CS; $0.29 \times 10^9/L$ after CS; 74% distributed amongst all PBL phenotypes (T3, T4, T8, helper-inducer, suppressor, B cell). However, RA patients with high ALA had less marked reduction after CS ($0.80 \times 10^9/L$ before CS; $0.59 \times 10^9/L$ after CS), particularly with helper-inducer cells remaining unaffected.

Anti-lipocortin antibodies may impair CS-induced peripheral blood lymphopenia, especially with no change in the helper-inducer cell count. These reduced CS effects in vivo may be due to anti-lipocortin antibodies, and may be relevant in relative "steroid resistance" in RA.

A93

SERUM INTERLEUKIN 2 RECEPTOR LEVELS REFLECT ACTIVITY OF RHEUMATOID ARTHRITIS. D.H. Cannon, G.R. Ekermann and D.A. Horvitz USC School of Medicine, Los Angeles, 90033

Increased levels of serum IL-2 receptors (sIL-2R) are detected in patients with rheumatic diseases characterized by immune system activation. Here we determined the relationship between sIL-2R and activity of rheumatoid arthritis (RA). 12 patients with active RA treated with amiprilose HCl (Therafectin) were studied for 16 to 52 weeks and were divided into 2 groups according to clinical improvement. Before therapy the mean sIL-2R levels in both RA groups were 720 ± 62 u/ml vs normals <300 u/ml. In 8 patients who improved after Therafectin, both the Pain/Tenderness (P/T) index and sIL-2R decreased by 58% after 24 weeks. By comparison, in 4 with no change in the P/T index, sIL-2R increased from 695 to 850u/ml. In 8 responders, there was a strong correlation between sIL-2R and the P/T index ($r = 0.76$). In those patients that improved there were strong correlations between sIL-2R and joint swelling, grip strength and morning stiffness, but not with changes in walking time or global assessment. In two cases a rebound increase in sIL-2R predicted a clinical flare. There were no significant correlations between measures of RA activity and the Westergren ESR. The strong relationship between sIL-2R and various indices of rheumatoid arthritis activity in patients studied sequentially suggests that sIL-2 may be an especially useful serologic marker of disease activity.

A91

LONG TERM FOLLOW-UP OF RECOMBINANT INTERFERON-GAMMA IN RHEUMATOID ARTHRITIS. GW Cannon, Salt Lake City UT; JD Schindler and SM Emkey, Boston MA; RD Emkey, W. Reading PA; A Denes, Hemet CA; SA Stratford CT; F Wolfe, Wichita KS; PA Saway, Birmingham AL; Jiffer, Lajolla CA; AL Weaver, Lincoln NE; L Cogen, Portland ME.

Seventy of 84 rheumatoid arthritis (RA) patients completing a 12 week multicenter double-blind trial comparing recombinant interferon-gamma (r-IFN-g) with placebo were enrolled in a long term protocol evaluating r-IFN-g in RA. Patients received 100 ug r-IFN-g (Biogen Research Corp., specific activity 25 MU/mg) by subcutaneous injection 3 times weekly for the first 12 weeks; afterwards r-IFN-g injections were given 3-7 times weekly and adjusted individually. All patients have now been followed for at least 14 months since study entry.

Thirty-eight patients continue to receive r-IFN-g with clinical benefit. r-IFN-g was discontinued in 32 patients. Twenty-three patients withdrew for lack of efficacy, 5 of whom experienced a flare of disease. Four patients withdrew consent. Two patients discontinued r-IFN-g for suspected adverse drug reactions - gastrointestinal distress and "flu-like" symptoms. r-IFN-g was discontinued in three patients for the development of concurrent illness (pericarditis, pneumonia, and abdominal pain) which may or may not have been adverse reactions to r-IFN-g. Several patients developed local reactions at the site of r-IFN-g injection. Long term treatment of RA with r-IFN-g was generally well tolerated and was associated with sustained clinical improvement in RA patients. Further double-blind trials and long term follow-up with larger groups are in progress to further define the potential efficacy and tolerability of r-IFN-g in RA.

A94

CLOTRIMAZOLE (C) VERSUS PLACEBO (P) IN RHEUMATOID ARTHRITIS (RA). William B. Dennison, Robert A. Turner, June A. Johnson, Bradley Wells. Bowman Gray School of Medicine, Winston-Salem, NC 27103.

This is the first P controlled double-blind trial using the imidazole C in the treatment of RA. A sufficient number (64) of patients were enrolled to provide a power ≥ 0.80 (possibility of false negative result $\leq 20\%$) using observations from a previous study with immunomodulating agents at this institution. A total of 73 patients with active classical or definite RA were randomized and given either 20mg/kg/day 2 days per week of C or a matching P. Thirty patients in the C group and 34 patients in the P group completed at least 4 weeks of therapy. The C group showed significant ($P < 0.05$) improvements in grip strength (\pm SEM= 125 ± 10.3 mmHg \rightarrow 138 ± 11.5), joint count ($27 \pm 3.0 \rightarrow 24 \pm 3.0$) and patient assessment of pain ($6 \pm 0.4 \rightarrow 5 \pm 0.4$) when comparing initial to final measurements. The P group also had a significant ($P < 0.025$) response in grip strength ($120 \pm 12.2 \rightarrow 134 \pm 12.7$). There was no significant difference in the response of the C group vs. the P group. Drop-out analysis revealed 18 patients in the C group withdrawing prior to completion (9-adverse experiences, 5-lack of effect, 4-other, i.e. intercurrent illness, lost to follow-up, etc.). In the P group, 11 patients withdrew (11-adverse experience, 5-lack of efficacy, 4-other). Total adverse experiences were more frequent in the C treated group (86) than in the P group (60) with a significant ($P < 0.05$) increase in the occurrence of upper GI (23 vs. 14), GU (13 vs. 6) and CNS (13 vs. 5) symptoms. There was no difference in the occurrence of symptoms described as Herxheimer-like reactions. This study, using a placebo group and an adequate patient population as determined from previous studies, showed statistical evidence of toxicity but not efficacy for C in the treatment of RA.

A92

EFFECT OF TREATMENT WITH NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDs) ON IN VITRO SPONTANEOUS RHEUMATOID FACTOR (RF) SYNTHESIS IN PATIENTS WITH RHEUMATOID ARTHRITIS. JJ Cush, HE Jasim, PE Lipsky. UT Southwestern Medical Center, Dallas, TX 75235

The following studies were undertaken to determine whether the use of conventional NSAID therapy is associated with alterations of in vitro and in vivo synthesis of IgM RF and the relationship of these changes to the clinical status of patients with rheumatoid arthritis (RA). Eleven patients with RA, who were taking neither disease-modifying drugs nor corticosteroids were prospectively examined. Following a 2 week washout, patients were treated with either flurbiprofen or ibuprofen for 10 weeks. Patient responses were assessed by clinical criteria, which included 50 ft. walk time, joint score, morning stiffness, and patient and physician assessments. Five patients qualified as responders and the remaining 7 failed to respond. Peripheral blood mononuclear cells (PBM) were obtained at enrollment, after the washout, and at the completion of therapy. PBM were cultured for 10 days without stimulation and culture supernatants were measured for IgM and IgG RF by radioimmunoassay. Two patients showed no spontaneous RF in vitro and were not included in the analysis of in vitro studies. After 8 weeks of NSAID therapy, 4 of 5 nonresponders increased their spontaneous RF synthesis and, in 3 of these patients, increases in RF synthesis were not related to increases in spontaneous IgM production. In the nonresponders, there were no significant changes in serum RF levels. In contrast, all 4 responders demonstrated significant reductions in spontaneous RF synthesis ($p=0.009$), ratio of spontaneous RF IgM ($p=0.001$), and serum RF ($p=0.012$). These results indicate that a favorable clinical response to NSAID therapy may be associated with the specific inhibition of IgM RF synthesis both in vitro and in vivo.

A95

IN VITRO EFFECTS OF PROCAINAMIDE METABOLITES ON HUMAN CELLULAR FUNCTION. EV Hess, RJ Donovan-Brand, and LE Adams. University of Cincinnati Medical Sciences Center, Cincinnati, OH 45267.

Drug-related lupus may follow procainamide (PA) administration. The exact mechanism is unknown but recent studies suggest that metabolites of PA, hydroxylamine (PAHA) and a nitroso derivative (NO-PA), may be responsible. To evaluate the effect of PAHA and NO-PA on cellular function in vitro, varying concentrations of PAHA (2-75 μ M) and NO-PA (1-13 μ M) were preincubated with whole blood (WB) or co-cultured with PBMCs from 26 normal subjects for varying time intervals. N-acetyl-PA, PA and cells alone were studied for comparison. Lymphocytes were cultured for 3, 5 or 7 days with mitogens and DNA synthesis measured by 3 H-TdR uptake. Cell surface immunoglobulin (SmIg) and enumeration of T-cell subpopulations were examined by fluorescence flow cytometry; antibody synthesis, IL-1 production and the effect of metabolites on the release of oxygen free radicals by phagocytic cells were assayed by standard methods. Cell viability was assessed by trypan blue exclusion. Results showed cytotoxicity and suppression of 3 H-TdR uptake with both metabolites at high concentrations and augmentation of DNA synthesis, SmIg and PFC response with the lower concentration of PAHA. Pre-treatment of the WB with ascorbic acid or carbon monoxide prior to exposure to PAHA abrogated or reduced the methemoglobin formation and restored the subsequent lymphoproliferative responses. O₂ production by polymorphonuclear cells pre-treated or co-incubated with PAHA was found to be concentration dependent. These results indicate that PAHA and NO-PA have immunomodulating properties; studies are currently underway to evaluate the role of these metabolites on the induction of autoimmunity.

Abstract

Seventy-three patients with rheumatoid arthritis were randomized in a double blind study to receive either clotrimazole (20 mg/kg/day) two days a week for 12 weeks or matching placebo. Patients receiving clotrimazole had significant improvements ($p < 0.05$) from baseline in measurements of grip strength, joint count, and patient assessment of pain, but did not improve significantly more than patients on placebo. More adverse experiences occurred in patients taking clotrimazole with gastrointestinal complaints predominating and nine patients discontinued therapy because of these.

Introduction

Clotrimazole [1-(0-chloro- α , α -diphenylbenzyl)imidazole] is an imidazole derivative which is utilized medically primarily for its anti-mycotic effects as a topical treatment for vulvovaginal and oral candidiasis (1). Clotrimazole and other imidazoles have also been shown to have immunomodulating properties such as a dose-dependent inhibition of PMN chemotaxis (2) and inhibition of lymphocyte stimulation by phytohemagglutinins, concanavalin-A and pokeweed mitogen (3). Imidazoles such as cimetidine (4), phenytoin (5), metronidazole (6), levamisole (7), fenflumizole (8), imidazole-2-hydroxybenzoate (9), tiplamizole (10), and clotrimazole (11, 12) have been studied in the treatment of rheumatoid arthritis with mixed results. After the report of an encouraging but uncontrolled study, clotrimazole was compared to ketoprofen in a controlled study by Wotjulewski, et al (12). "Up to 80 mg/kg/day of clotrimazole" was given orally for eight weeks, and although there was a trend in favor of the clotrimazole group during the second month, only one parameter reached statistical significance. Adverse effects were more common in the clotrimazole group and 7/24 patients in that group withdrew.

Our study was designed to assess the efficacy and safety of a lower dose of clotrimazole in the treatment of rheumatoid arthritis.

Materials and Methods

A total of 73 adult patients from the Rheumatology Clinics at North Carolina Baptist Hospital were entered into the study. Eligibility required either definite or classical rheumatoid arthritis by the ARA criteria. Active disease was defined by the presence of three of the following: number of tender or painful joints ≥ 6 , number of swollen joints ≥ 3 , duration of morning stiffness $\geq 3/4$ hour, or Westergren erythrocyte sedimentation rate (ESR) > 28 mm/hr.

All patients signed informed consent documents as approved by the local Clinical Research Practices Committee. Patients were excluded if signs or symptoms of other rheumatic diseases were present, as were patients with active peptic ulcer disease, gastritis, or other important GI diseases, cirrhosis, liver enzyme abnormalities $> 20\%$ above the upper limits of normal, or any active systemic disease not well controlled by medications or potentially causing a problem to the patient. Pregnant or lactating females and premenopausal females not following acceptable birth control methods were excluded as well as patients treated with corticosteroids or second line agents such as gold, Penicillamine, antimalarials, or cytotoxic drugs. Stable NSAID therapy was allowed.

Patients were randomized to two double blinded treatment groups. They took either clotrimazole in 250 mg. compressed/scored tablets (provided by Miles Pharmaceuticals, West Haven, CT) or an identical placebo tablet in a dose of 20 mg/kg/day in four divided doses for two consecutive days per week for 12 weeks. For inclusion in the efficacy analysis, a patient had to complete at least four weeks of therapy; all patients were included in the adverse experiences analysis.

After the initial history, physical, and laboratory analyses patients were assessed on a weekly basis. Hours of morning stiffness, grip strength, total joint count, 10 point patient and observer visual analogue scales, and weekly stool hemoccult cards were obtained at each visit. Automated serum chemistries

(SMAC), urinalysis, and CBCs were obtained every other week and a rheumatoid factor (RA latex) and ESR were obtained on the first and the twelfth visits or at drop-out. A modified rheumatoid activity index (MRAI) was calculated as previously described (13).

Adverse experiences were defined as untoward signs and symptoms which could in any way be related to drug administration. A question was posed to the patient "How do you feel?" on each visit and the answer recorded. These were later reviewed and categorized by the investigator prior to unblinding. If a patient withdrew prior to study completion, an effort was made to determine the reason for drop-out. A history and physical examination and laboratory assessments were performed at dropout or at study completion.

Statistical Considerations. Estimation of the required sample size was made using data on variability from from a recent six month protocol comparing 500 mg/day Penicillamine with up to 100 mg/day Azathioprine. These indicated that for a Type I error equal to 0.05 (two tailed t test), a power of 0.80, and true difference between groups in initial to final MRAI of 11, 32 patients per group would be needed.

Measurements in Table 1 were used to evaluate efficacy. Paired t statistics were calculated to test average changes within treatment groups. Differences between average changes for treatment groups were tested with a two sample t test. Chi square analyses were performed on adverse experience data. No adjustments were made for multiple comparisons.

Results

A total of 73 patients were enrolled in this study, 37 in the placebo group and 36 in the clotrimazole group. The patients in each group were well matched with respect to disease duration (\bar{x} of each group = 112 months), age (\bar{x} of each group = 51 years) and the male/female ratio. Six patients in the clotrimazole group and three patients in the placebo group did not complete four weeks of

treatment and were excluded from the efficacy analysis leaving 30 and 34 patients in the respective groups. When considering initial clinical measurements for these patients (Table 1) there was a significantly a higher initial ESR (51 mm/hr vs. 35 mm/hr) ($p < 0.025$) for the clotrimazole patients. Differences between groups in the other entry parameters were not significant.

Both clotrimazole and the placebo groups had significant improvements in grip strength ($p < 0.05$ and $p < 0.025$) (Table 1). The clotrimazole group also showed significant ($p < 0.05$) improvements in joint count and patient assessment of pain. Measurements of ESR, RA latex, and MRAI showed improvements for the clotrimazole group but these were not significant. There were no significant differences between changes within the clotrimazole group compared to changes within the placebo group. No significant changes were observed in white blood cell counts either within or between groups. Additional analyses compared those clotrimazole patients who completed a 12 week course ($n=19$), to those who completed 4-8 weeks ($n=9$); also placebo patients completing 12 weeks ($n=26$) were compared with the corresponding clotrimazole group ($n=19$) and no significant differences were found.

Withdrawals. In the placebo group, 11 patients withdrew prior to the completion of the study, while 18 patients in the clotrimazole group withdrew (Table 2). Clotrimazole dropouts occurred somewhat earlier on average than placebo dropouts. Lack of effect as perceived by the patient was given as the reason for withdrawal in five patients in both groups. In the placebo group, one patient developed a skin rash and was withdrawn from the study, while 9 patients in the clotrimazole group were withdrawn because of adverse experiences. Only 4/9 patients in this group withdrew within the first four weeks. Reasons included: burning upon urination, decreased mental alertness, upper gastrointestinal tract symptoms, and elevated liver enzymes. Other adverse experiences occurred in the nine patients and 19 of 89 total occurrences were in these patients. Five patients in the placebo group and four patients in

the clotrimazole group were either lost to follow up or withdrew from the study because of an intercurrent illness. In addition, there were more adverse experiences in the clotrimazole patients, both among those who withdrew prior to 12 weeks and those who completed the study.

Adverse Experiences. Adverse experiences were common in both groups with 89 separate occurrences in the clotrimazole group and 60 in the placebo group (Table 3). Upper gastrointestinal symptoms were the most frequent adverse experience in both groups with a significantly greater ($p < 0.05$) number of occurrences in the clotrimazole group. Approximately 64% of patients in that group complained of nausea, vomiting, epigastric burning, indigestion, anorexia or regurgitation. Complaints of burning upon urination (genitourinary) were more common ($p = 0.053$) in the clotrimazole group, as were CNS adverse experiences ($p < 0.025$) including decreased mental alertness and taste abnormalities. Liver function test elevation (i.e. SGOT, SGPT, GGT) were more frequent in the clotrimazole group but this was not significantly different. Only one patient in the clotrimazole group was withdrawn because of elevated LFTs. A total of five patients in both groups had abnormal liver function tests which resolved while on treatment. Five patients in the clotrimazole group had sustained mild elevation in LFTs which resolved after completion of the study compared to three patients in the placebo group. No patient in either group had serious long term morbidity resulting from treatment.

Discussion

Wyburn-Mason (11) reported dramatic and essentially curative results in an uncontrolled study using clotrimazole at the daily dose of "25-100 mg/kg body weight" for less than one month. He also noted similar results with only 10-12 mg/kg. A controlled study (12) attempted to confirm this using 40 mg/kg/day clotrimazole and increasing this to 80 mg/kg/day in divided doses. Clotrimazole in these doses compared to ketoprofen at 50 mg. p.o. t.i.d. produced no significant differences in clinical measurements after eight weeks of treatment

in 47 patients. One measurement, grip strength, favored clotrimazole at four weeks. There was a trend in favor of the clotrimazole group after four weeks and the consumption of analgesics was significantly lower in this group during the second month. It was felt in our study that we could reduce type II error by increasing sample size and that by increasing the duration of clotrimazole administration to 12 weeks and comparing it to placebo, a difference could be found if it existed.

There were statistically significant improvements in clinical measurements in both the placebo group and the clotrimazole group but the level of these changes were not statistically significant between the groups. The trend toward improvement in the clotrimazole group might have reached statistical significance had a larger number of patients been included in each group, larger doses of clotrimazole been employed or a longer treatment regimen been utilized.

Entry erythrocyte sedimentation rates were significantly higher in the clotrimazole group than the placebo group. However, when calculating the MRAI (13) in which the the erythrocyte sedimentation rate is used in part, no difference could be detected in disease activity.

This study resulted in a greater occurrence of adverse experiences and withdrawals when using clotrimazole than was noted in previous studies (11,12). Differences in definition of adverse experiences and concomitant NSAID treatment could explain, in part, the comparatively large numbers of adverse experiences in our study. The predominance of upper gastrointestinal symptoms confirms Wotjulewski's experience (12). An explanation of the complaint of burning upon urination was not found when examining the urine chemistry and sediment.

In conclusion, this study revealed no significant difference in efficacy in patients treated for at least four weeks with either clotrimazole or placebo. Adverse experiences were significantly greater in the clotrimazole treated group. These findings thus do not support a therapeutic role for clotrimazole

as utilized in this study for the treatment of patients with rheumatoid arthritis.

1. Sawyer PR, Brogdon RN, Pinder RM, Splight TM, Avery GS. Clotrimazole: A review of its antifungal activity and therapeutic efficacy. *Drugs* 9:424-427, 1975.
2. Rowan-Kelly B, Ferrante A, Thong YH. Modification of polymorphonuclear leucocyte function by imidazoles. *Int J Immunopharmacol* 6:389-393, 1984.
3. Gow PJ, Corrigan V, Panayi GS. The effect of clotrimazole on human leucocyte responsiveness to plant mitogens. *Agents Actions* 9:543-548, 1979.
4. Permin H, Stahl Skov P, Norn S, Geisler A, Klysner R, Wilk A, Manthorpe R, Nielsen H, Petersen J. Possible role of histamine in rheumatoid arthritis. *Allergy* 36:435-436, 1981.
5. Grindulis KA, Nichol FE, Oldham R. Phenytoin in rheumatoid arthritis. *J Rheumatol* 13:1035-1039, 1986.
6. Harkness JA, Griffen AJ, Heinrich I, Gibson T, Graham R. A double-blind comparative study of metronidazole and placebo in rheumatoid arthritis. *Rheumatol Rehab* 21:231-234, 1982.
7. Multicenter study group: Levamisole in rheumatoid arthritis. *Ann Rheum Dis* 41:159-163, 1982.
8. Christensen, K. A double-blind placebo controlled evaluation of fenflumizole in rheumatoid arthritis. *Scand J Rheum* 15:80-84, 1986.
9. Fumagalli M, Cunietti E, Vaiani G, Monti M, Ferrari F, Gandini R. Controlled clinical trial of imidazole-2-hydroxybenzoate (ITF 182) versus Sulindac in patients with rheumatoid arthritis. *Clin Ther* 8:292-300, 1986.
10. Ackerman NR, Cherkofsy SC, Clark R, Collier JM, Galbraith W, Habor SB, Howes WE, Rakestraw DC, Shotzberger GS, Sharpe TR, Whitney SC. Tiflamizole, anti-inflammatory and anti-rheumatic drugs. Volume III.

Anti-rheumatic drugs, experimental agents and clinical aspects of drug use.

Edited by K. O. Rainsford. Boca Raton, FL 1985 pp 155-164.

11. Wyburn-Mason R. Clotrimazole in rheumatoid arthritis (letter). *Lancet* I: 489, 1976.
12. Wotjulewski JA, Gow PJ, Walter J, Grahame R, Gibson T, Panayi GS, Mason J. Clotrimazole in rheumatoid arthritis. *Ann Rheum Dis* 39:469-472, 1980.
13. David JD, Turner RA, Collins RL, Ruchte I, Kaufmann JS. Fenoprofen, aspirin and gold induction in rheumatoid arthritis. *Clin Pharmacol Ther* 21:52-61, 1977.

Table 1. Changes in Clinical Measurements in Patients Completing 4-12 Weeks of Treatment with Clotrimazole or Placebo*

Measurement	Placebo (n=34)			Clotrimazole (n=30)			p+
	Initial	Final	Difference	Initial	Final	Difference	
Grip Strength (mm Hg)	120 ± 12.2	134 ± 12.7	+14.9 ± 5.4‡	125 ± 10.3	138 ± 11.5	+13.1 ± 5.8§	0.823
Joint Count (0-60)	30 ± 2.7	28 ± 3.1	-2.6 ± 2.5	27 ± 3.0	24 ± 3.2	-3.3 ± 1.6§	0.813
Patient Assessment of Pain (0-10)	6 ± 0.3	6 ± 0.4	-0.2 ± 0.3	6 ± 0.4	5 ± 0.4	-0.8 ± 0.4§	0.216
Observer Assessment of Pain (0-10)	5 ± 0.3	5 ± 0.4	-0.1 ± 0.3	5 ± 0.3	5 ± 0.3	-0.2 ± 0.3	0.795
ESR (mm/Hr)	35 ± 4.2	38 ± 4.5	+2.8 ± 3.4	51 ± 5.3	48 ± 5.5	-3.6 ± 3.0	0.181
RA Latex (tube dilutions)	6 ± 0.5	6 ± 0.4	+0.1 ± 0.2	7 ± 0.5	6 ± 0.5	-0.5 ± 0.3	0.128
MRAI¶	97 ± 5.9	93 ± 6.9	-4.2 ± 4.3	99 ± 5.8	90 ± 6.9	-8.9 ± 4.3	0.436

*Values shown are mean ± SEM

+Clotrimazole treated group versus placebo treated group by two sample test

‡p<0.025

§p<0.05

¶Modified rheumatoid activity index

Table 2. Summary of Patients Withdrawing Prior to Study Completion

	Placebo	Clotrimazole
Number enrolled	37	36
Number withdrawing < 4 weeks*	3	6
Total Withdrawals	11	18
<u>Reason for Withdrawal</u>		
Adverse experience	1	9
Lack of effect	5	5
Unrelated+	5	4

*Excluded from efficacy analysis

+Intercurrent illness; lost to follow-up

Table 3. Number of Patients With Adverse Experiences by Category

	Placebo (n=37)	(%)*	Clotrimazole (n=36)	(%)	P+
Systemic	9	(24.3)	5	(13.9)	0.26
Musculoskeletal	2	(5.4)	2	(5.6)	0.98
Gastrointestinal					
Upper	14	(37.8)	23	(63.9)	0.26
Other	12	(32.4)	11	(30.6)	0.86
Genitourinary	6	(16.2)	13	(36.1)	0.053
Skin	4	(10.8)	6	(16.7)	0.47
Central Nervous System	5	(13.5)	13	(36.1)	0.025
Liver Function Tests (elevated)					
Transient	2	(5.4)	3	(8.3)	0.67
Sustained	3	(8.1)	5	(13.9)	0.43
Other‡	3	(8.1)	8	(22.2)	0.092
Total	60		89		

*Percentage of patients in each group with adverse experiences (table includes patients with more than one adverse experience, therefore total does not equal 100%)

+Chi square analysis

‡"Other" includes upper respiratory infection symptoms and transient epistaxis

AMERICAN RHEUMATISM ASSOCIATION

52nd Annual Scientific Meeting
May 23-28, 1988 — Houston, Texas

ABSTRACT RECEIPT DEADLINE: Friday, January 8, 1988

Processing Fee	_____
Blind Abstract #	_____
Revised Abstract #	_____
Session	_____

Bowman Gray

- INDICATE SUBSECTION CATEGORY (Check only one box):
- A. Humoral Immunology
 - B. Cellular Immunology
 - C. Inflammation
 - D. Biochemistry
 - E. Cartilage
 - F. Molecular Biology & Genetics
 - G. Mineral Metabolism & Bone
 - H. RA — Etiology & Pathogenesis
 - I. RA — Clinical Features & Therapy
 - J. SLE — Etiology & Pathogenesis
 - K. SLE — Clinical Features & Therapy
 - L. Scleroderma
 - M. Osteoarthritis
 - N. Spondyloarthropathies
 - O. Miscellaneous — Connective Tissue Diseases
 - P. Miscellaneous — Soft Tissue, Infection, Other
 - Q. Pediatrics
 - R. Orthopedics
 - S. Epidemiology & Health Services Research
 - T. Rehabilitative Rheumatology

TYPE ABSTRACT HERE/BE SURE TO STAY WITHIN BORDER

CLOTRIMAZOLE (C) VERSUS PLACEBO (P) IN RHEUMATOID ARTHRITIS (RA).
 William B. Dennison, Robert A. Turner, June A. Johnson, Bradley Wells.
 Bowman Gray School of Medicine, Winston-Salem, NC 27103.

This is the first P controlled double-blind trial using the imidazole C in the treatment of RA. A sufficient number (64) of patients were enrolled to provide a power ≥ 0.80 (possibility of false negative result $\leq 20\%$) using observations from a previous study with immunomodulating agents at this institution. A total of 73 patients with active classical or definite RA were randomized and given either 20mg/kg/day 2 days per week of C or a matching P. Thirty patients in the C group and 34 patients in the P group completed at least 4 weeks of therapy. The C group showed significant ($P < 0.05$) improvements in grip strength ($x \pm SEM = 125 \pm 10.3 \text{ mmHg} \rightarrow 138 \pm 11.5$), joint count ($27 \pm 3.0 \rightarrow 24 \pm 3.0$) and patient assessment of pain ($6 \pm 0.4 \rightarrow 5 \pm 0.4$) when comparing initial to final measurements. The P group also had a significant ($P < 0.025$) response in grip strength ($120 \pm 12.2 \rightarrow 134 \pm 12.7$). There was no significant difference in the response of the C group vs. the P group. Drop-out analysis revealed 18 patients in the C group withdrawing prior to completion (9-adverse experiences, 5-lack of effect, 4-other, i.e. intercurrent illness, lost to follow-up, etc). In the P group, 11 patients withdrew (1-adverse experience, 5-lack of efficacy, 4-other). Total adverse experiences were more frequent in the C treated group (86) than in the P group (60) with a significant ($P < 0.05$) increase in the occurrence of upper GI (23 vs. 14), GU (13 vs. 6) and CNS (13 vs. 5) symptoms. There was no difference in the occurrence of symptoms described as Herxheimer-like reactions. This study, using a placebo group and an adequate patient population as determined from previous studies, showed statistical evidence of toxicity but not efficacy for C in the treatment of RA.

Check box if your material is such that it can only be presented as a poster.

PLEASE CHECK ABSTRACT CAREFULLY FOR APPEARANCE BEFORE MAILING

Do not obliterate these questions and answers when preparing the blind copy.

Previously published? Where & When? No

Presented at a national meeting? Where & When? No

Presented at a regional meeting? Where & When? No

Accepted for publication? Where & When? No

Do not fold this sheet. Use cardboard backing when mailing.

Send Abstract Form A, Transmittal Form B (plus two copies of each), blind copy, and processing fee to:

Annual Scientific Meeting
 American Rheumatism Association
 17 Executive Park Drive, N.E.
 Suite 480
 Atlanta, Georgia 30329

ARA Member Yes _____ No X
 Signature of Author Submitting Abstract _____

If presenting author is not an ARA member, this abstract must be signed by an ARA sponsoring member:

Sponsor's Signature _____