



Fibromyalgia Is Common in a Postpoliomyelitis Clinic

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The Archives of Neurology June 1995 Volume [52 620-624](#)

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Abstract

Objective: To determine prospectively the occurrence and clinical characteristics of fibromyalgia in patients serially presenting to a postpolio clinic. Fibromyalgia may mimic some of the symptoms of postpoliomyelitis syndrome, a disorder characterized by new weakness, fatigue, and pain decades after paralytic poliomyelitis.

Design: Case series.

Setting: A university-affiliated hospital clinic.

Patients: One hundred five patients were evaluated with a standardized history and physical examination during an 18-month period. Ten patients were excluded because of the absence of past paralytic poliomyelitis.

Interventions: Patients with fibromyalgia were treated with low-dose, nighttime amitriptyline hydrochloride or other conservative measures.

Main Outcome Measures: Patients with fibromyalgia had diffuse pain and 11 or more of 18 specific tender points on examination (American College of Rheumatology criteria, 1990). Patients with borderline fibromyalgia had muscle pain and five to 10 tender points on physical examination.

Results: Ten (10.5%) of 95 postpolio patients met the criteria for fibromyalgia, and another 10 patients had borderline fibromyalgia. All patients with fibromyalgia complained of new weakness, fatigue, and pain. Patients with fibromyalgia were more likely than patients without fibromyalgia to be female (80% vs 40%, $P<.04$) and to complain of generalized fatigue (100% vs 71%, $P=.057$), but were not distinguishable in terms of age at presentation to clinic, age at polio, length of time since polio, physical activity, weakness at polio, motor strength scores on examination, and the presence of new weakness, muscle fatigue, or joint pain. Approximately 50% of patients in both the fibromyalgia and borderline fibromyalgia

groups responded to low-dose, nighttime amitriptyline therapy.

Conclusions: (1) Fibromyalgia occurs frequently in a postpolio clinic. (2) Fibromyalgia can mimic some symptoms of postpoliomyelitis syndrome. (3) Fibromyalgia in postpolio patients can respond to specific treatment.

End Abstract

POSTPOLIOMYELITIS syndrome is a recently recognized syndrome of new weakness, fatigue, and pain that may occur in more than 50% of individuals who have recovered from paralytic poliomyelitis.^[1-4] Even though acute poliomyelitis is now a rare disease in developed countries,^[5] approximately 640 000 individuals who have survived this illness are alive today in the United States.^[6]

Fibromyalgia syndrome is a common musculoskeletal disorder, characterized by generalized pain and tenderness.^[7] Other common associated features include nonrestorative sleep, fatigue, and morning stiffness.^[7] A recent study has determined that a history of widespread pain and the finding of 11 or more of 18 specific tender points on examination are the most useful criteria in distinguishing patients with fibromyalgia syndrome from age- and sex-matched controls with disorders that could be confused with fibromyalgia syndrome.^[8] Because some of the symptoms of fibromyalgia, notably pain and fatigue, are similar to those found in postpoliomyelitis syndrome and may respond to specific treatment for fibromyalgia, we sought to prospectively identify the frequency and clinical characteristics of fibromyalgia in patients presenting to a postpolio clinic.

PATIENTS AND METHODS

We prospectively studied 105 patients serially presenting to the Montreal (Quebec) Neurological Hospital postpolio clinic for postpoliomyelitis syndrome and fibromyalgia syndrome in an 18-month period between January 1991 and June 1992. Patients are referred to the clinic for evaluation of specific problems; however, a proportion of patients are asymptomatic and come to obtain information about postpoliomyelitis syndrome. All patients were evaluated with a standardized history and physical examination by one of us (D.A.T.). Appropriate diagnostic tests were performed at the time of or immediately following this evaluation. Ten patients were excluded from the study because of the absence of a history and physical examination consistent with prior paralytic poliomyelitis.

The criteria used for the diagnosis of fibromyalgia syndrome, proposed by the American College of Rheumatology^[8] in 1990, were as follows: (1) a history of widespread pain of more than 3 months' duration with (2) tenderness with palpation at 11 or more of 18 specific tender points or spots (bilateral occiput, lower cervical spine, second costochondral junction, trapezius, supraspinatus, lateral epicondyle, buttock, greater trochanter, and medial knee) and (3) no tenderness at specific control points (forearm, thumbnail, and third metatarsal). Another group of patients had "borderline fibromyalgia syndrome," consisting of a history of pain of at least 3 months' duration, five to 10 tender points on physical examination, and no tenderness at control points.

The criteria for postpoliomyelitis syndrome were based on those described by Mulder et al.^[9] They were (1) a history consistent with past paralytic poliomyelitis (an illness characterized by high fever, followed by muscular weakness), (2) partial or complete recovery of function, (3) a period of functional stability of at least 10 years' duration after initial recovery from poliomyelitis, (4) absence of medical conditions or other concurrent neurologic disorders that could produce weakness and fatigue, (5) absence of severe pain that could make differentiation between pain and weakness difficult, and (6) presence of new symptoms of increased or new muscular weakness and fatigue (muscular and/or general). The definitions of muscular

and general fatigue were increasing weakness with activity, improving with rest, and an overwhelming, "flulike" exhaustion, respectively.^[10]

Data on the following variables were obtained at the time of the initial standardized evaluation: age at time of presentation to clinic, sex, age at acute polio, latency or time in years between acute polio and presentation to clinic, presence of pain (muscular and/or joint), severity of weakness at acute polio, severity of weakness at time of presentation to clinic, physical activity, motor strength score at presentation, and the presence of new weakness, fatigue (muscle or general), and pain (muscle or joint).

The severity of weakness measure was based on patient estimates at the initial interview of percent weakness in each of four limbs, respiratory muscle weakness, and speech/swallowing dysfunction at acute polio and at presentation to clinic. Weakness in each of four limbs was rated from 0 to 100 (0 being normal and 100 being completely paralyzed). For respiratory muscle function, a 50 was assigned for some weakness and a 100 for weakness requiring use of a ventilator. A 50 was assigned for some speech and/or swallowing dysfunction and a 100 for complete loss of speech and/or swallowing. The sum total of all six figures was divided by 100 to produce a scale ranging from 0 to 6. The validity of this measure has been assessed previously.^[11]

A motor strength index for each patient was calculated as the sum of motor strength assessments done at time of presentation to clinic in each of five muscle groups in the upper extremities (deltoid, biceps, triceps, wrist extensors, hand intrinsic) and in each of five muscle groups in the lower extremities (hip flexors, quadriceps, hamstrings, dorsiflexors, plantarflexors) by a zero- to five point Medical Research Council scale.^[12]

Recent physical activity was calculated in a manner similar to that used by Klingman et al^[13]: 1, little or no regular participation in sports, manual labor, or walking; 2, occasional moderate sports activity (greater than or equal to 20 minutes one or two times per week) and/or mild to moderate demands at work and at home (eg, frequent ambulation for several hours at a time or occasional light lifting); and 3, frequent participation in sports (greater than or equal to 20 minutes two or more times per week) and/or moderate to heavy activities at work or home (eg, frequent heavy lifting or manual labor).

Statistical analysis involved the comparison of variables in patients with and without fibromyalgia with past paralytic polio with standard parametric procedures. The unpaired *t* test was used to compare continuous data, whereas Fisher's exact test was used to compare proportions. Statistical significance was accepted at *P* of .05 or less.

RESULTS

One hundred five patients were evaluated in the Montreal Neurological Institute postpolio clinic between January 1991 and June 1992. Ten patients without prior paralytic poliomyelitis were excluded. Of the 95 patients with past poliomyelitis, 44 met criteria for postpoliomyelitis syndrome as detailed in the "Patients and Methods" section. Ten (10.5%) of the 95 patients with past paralytic poliomyelitis evaluated in our clinic had fibromyalgia syndrome, according to American College of Rheumatology criteria.^[11] Another 10 patients (10.5%) had borderline fibromyalgia syndrome.

When the subgroup of patients meeting the diagnostic criteria for postpoliomyelitis syndrome were considered (44 patients), six (14%) also had fibromyalgia syndrome, another five (11%) also had borderline fibromyalgia syndrome, and the remaining 33 (75%) did not have fibromyalgia syndrome.

When the subgroup of patients with definite fibromyalgia syndrome was considered (10 patients), all

complained of new weakness, fatigue, and pain, but only six met the criteria for postpoliomyelitis syndrome. The four patients who did not meet the criteria for postpoliomyelitis syndrome in the fibromyalgia syndrome group were excluded because of severe pain (secondary to shoulder impingement syndrome in one and severe fibromyalgia in the remaining three). In the 10 patients with borderline fibromyalgia syndrome, five met the criteria for postpoliomyelitis syndrome. Of the five patients with borderline fibromyalgia syndrome who did not meet the criteria for postpoliomyelitis syndrome, one had increased weakness and pain, two had fatigue and pain, and two had complaints of increased weakness, fatigue, and pain, but had concomitant medical or neurologic conditions that may have been producing new difficulties. Thus, overlap of fibromyalgia syndrome and postpoliomyelitis syndrome occurred in 11 of the 95 patients with definite past paralytic poliomyelitis. A fibromyalgialike syndrome (including fibromyalgia syndrome and borderline fibromyalgia syndrome) was present in fully 25% of patients with postpoliomyelitis syndrome and in 21% of patients with past poliomyelitis attending our clinic.

The comparison of characteristics of poliomyelitis survivors with and without fibromyalgia syndrome is presented in [Table 1](#) and [Table 2](#). Patients with borderline fibromyalgia syndrome are discussed separately below. Poliomyelitis survivors with fibromyalgia syndrome were significantly ($P<.05$) different from poliomyelitis survivors without fibromyalgia syndrome in terms of female sex and the complaint of muscle pain; however, there were no significant differences between these two groups in terms of age at presentation to clinic, age at polio, length of time since polio, recent physical activity, weakness at polio, weakness on presentation, motor strength scores on examination, and the presence of new weakness, fatigue (muscle and/or general), and joint pain. There was a trend toward a greater occurrence of general fatigue in patients with fibromyalgia syndrome ($P=.06$).

Table 1. Comparison of Variables in Poliomyelitis Survivors With and Without Fibromyalgia (Continuous Variables)*

Variable	Scale	Fibromyalgia, Mean±SD (n=10)	No Fibromyalgia, Mean±SD (n=75)	P	95% CI of Difference
Age, y, at presentation	Years	50.8±11.05	50.3±12.11	.92	-6.87 - 7.87
Latency	Years	45.3±10.38	43.3±15.11	.40	-5.29 - 9.29
Age, y, at polio	Years	5.5±4.34	5.4±6.58	.96	-2.97 - 3.17
Physical activity	Physical activity index	1.6±0.66	1.74±0.64	.52	-0.21 - 0.62
Weakness at polio	Weakness severity measure	2.12±1.1	1.84±1.24	.50	-0.23 - 1.23
Weakness at presentation	Weakness severity measure	1.25±0.59	1.04±0.67	.35	-0.16 - 0.58
Motor strength score at presentation	Motor strength index	80.6±28.11	85.5±11.87	.32	-12.7 - 22.53

* P indicates two-tailed P value for unpaired t statistic for difference between patients with and without fibromyalgia; latency, difference between age at presentation to clinic and age at polio; 95% CI of difference, 95% confidence interval of difference between means in fibromyalgia and nonfibromyalgia groups. See text for description of computation of Weakness Severity Measure, Physical Activity Index, and Motor Strength Index.

Table 2. Comparison of Variables in Poliomyelitis Survivors With and Without Fibromyalgia (Categorical Variables)*

Variable	Proportions (%)		P	95% CI of Difference
	Fibromyalgia	No Fibromyalgia		
Sex, female	8/10 (80)	30/75 (40)	.04	12 - 67
PPS	6/10 (60)	33/75 (44)	.50	-15 - 47
New weakness	10/10 (100)	54/74 (73)	.11	18 - 38
Any fatigue	10/10 (100)	63/75 (84)	.34	8 - 24
Muscular fatigue	9/10 (90)	52/75 (69)	.27	7 - 35
General fatigue	10/10 (100)	53/75 (71)	.06	19 - 39
Any pain	10/10 (100)	62/75 (83)	.35	9 - 25
Muscle pain	9/10 (90)	39/75 (52)	.04	16 - 60
Joint pain	10/10 (100)	57/75 (76)	.11	14 - 34

* P indicates P value for a two-sided Fisher's Exact Test comparing proportions of patients in the fibromyalgia and the nonfibromyalgia groups; PPS, postpoliomyelitis syndrome; 95% CI of difference, 95% confidence interval of difference in proportions of patients in fibromyalgia and nonfibromyalgia groups (measured in percent).

Patients with borderline fibromyalgia syndrome were also predominantly female (70%). In the borderline fibromyalgia syndrome group, weakness at acute polio was 3.3 ± 1.45 (mean \pm SD), motor strength score on examination was 84.9 ± 12.7 , physical activity was 1.4 ± 0.49 , and age at presentation was 47.8 ± 7.85 years, which are comparable to the values found in the group of patients with fibromyalgia syndrome.

Ten patients in the fibromyalgia syndrome group and nine patients in the borderline fibromyalgia syndrome group were treated with low-dose amitriptyline hydrochloride (dose ranging from 10 to 50 mg every evening). Six of nine patients for whom outcome is known in the fibromyalgia syndrome group responded to amitriptyline therapy, while four of seven patients for whom outcome is known in the borderline fibromyalgia syndrome group reported improved conditions with amitriptyline therapy. Alternative treatments that were used after failure of amitriptyline therapy or in addition to amitriptyline included the following: cyclobenzaprine hydrochloride, 10 mg every evening; fluoxetine hydrochloride, 20 mg/d; naproxen; aerobic exercise; myofascial release therapy, and use of a cervical pillow. All four patients with fibromyalgia syndrome in whom alternative treatments were tried eventually experienced some improvement. Of the two patients in the borderline fibromyalgia syndrome group in whom

alternative treatments were used, one experienced improvement. Thus, specific treatment for fibromyalgia syndrome was helpful in most patients.

COMMENT

We have found that a fibromyalgialike syndrome occurs in a large proportion of patients evaluated in a postpoliomyelitis clinic (21%) and in a large proportion of patients who have postpoliomyelitis syndrome (25%). Because fibromyalgia syndrome is known to produce fatigue and pain, two symptoms that are attributed to postpoliomyelitis syndrome, fibromyalgia may mimic some symptoms of postpoliomyelitis syndrome. Patients with fibromyalgia syndrome and borderline fibromyalgia syndrome responded well to known treatments for fibromyalgia.

Although the exact prevalence of fibromyalgia syndrome in the community is unknown, it is believed to be a relatively common condition, occurring in 10.5% of women aged 20 to 40 years in Norway.[\[14\]](#) Prevalence rates have been reported in several clinics: 2.1% in a family practice clinic,[\[15\]](#) 5.7% in a general medical clinic,[\[16\]](#) and ranging from 3.7% to 20.0% in rheumatology clinics.[\[17,18\]](#) Thus, the prevalence rate of fibromyalgia syndrome in a postpolio clinic population (10.5%) is greater than that in general medical or primary care clinics, and comparable to that observed in rheumatology clinics.

The demographic characteristics of patients with fibromyalgia syndrome vary depending on the clinical population from which they are drawn.[\[7\]](#) A clear predominance for women has been noted, the proportion of women in populations of patients with fibromyalgia syndrome ranging from 73% to 88%.[\[15-18\]](#) The mean age has varied from 34 to 56 years.[\[15-18\]](#) In our series, patients with fibromyalgia syndrome were also predominantly female (80%) and had a similar mean age (50 years) to that reported in previous studies of fibromyalgia syndrome. Because fibromyalgia syndrome is known to improve with aerobic exercise,[\[19\]](#) a sedentary lifestyle may contribute to the development of fibromyalgia syndrome. The fact that many patients with past paralytic poliomyelitis have residual weakness that may make them less active may account for the relatively high rate of occurrence of fibromyalgia syndrome in a postpoliomyelitis clinic. However, our study showed that even though patients with prior paralytic poliomyelitis with fibromyalgia syndrome were weaker at polio and at presentation to clinic, and had a slightly lower level of physical activity than patients without fibromyalgia syndrome, these differences were not statistically significant. It is possible that a study with a larger sample size and with the use of more accurate measures would have resulted in a finding of significant differences between these patient groups.

Treatment of fibromyalgia syndrome can consist of low-dose nighttime amitriptyline or cyclobenzaprine,[\[20,21\]](#) aerobic exercise,[\[19\]](#) and management of sleep apnea that may be present in 44% of male patients with fibromyalgia syndrome.[\[22\]](#) Other possible treatments include nonsteroidal anti-inflammatory medications (although not shown to be definitively effective[\[20,23\]](#)), relaxation techniques, heat, massage, or injection of local anesthetics.[\[23\]](#) Approximately 50% of our patients, both in the fibromyalgia syndrome and borderline fibromyalgia syndrome groups, responded to amitriptyline therapy, and if this medication was insufficient or ineffective, most patients benefited from an alternative treatment.

Postpoliomyelitis syndrome is probably due to a distal degeneration of enlarged postpoliomyelitis motor units produced by terminal axonal sprouting during recovery from acute poliomyelitis[\[24,25\]](#) and a failure of a continuous remodeling process, involving ongoing denervation and reinnervation, of postpolio motor units.[\[25-27\]](#) These processes may produce the clinical symptoms of increased weakness and fatigue.[\[24,25,28-31\]](#) Pain in patients with postpoliomyelitis syndrome is usually due to a variety of musculoskeletal abnormalities.[\[6,31\]](#) We have now identified fibromyalgia syndrome as a significant

cause of fatigue and pain in patients who have recovered from paralytic poliomyelitis. Other possible contributing factors to postpoliomyelitis syndrome are chronic overuse[32] and the normal aging process. [11,31] With aging, there is a progressive dropout of motor units[31,33] and a reduction in growth hormone and somatomedin C (insulinlike growth factor).[34,35] The growth hormone/somatomedin C axis stimulates the synthesis of protein and nucleic acids in muscle cells[36] and the regeneration of peripheral nerves after injury, including sprouting.[37,38] Eighty percent of growth hormone is produced during stage 4 sleep,[35] and disruption of this stage of sleep in fibromyalgia syndrome[39] may produce a reduced secretion of the hormone. Somatomedin C level has been found to be low in patients with postpoliomyelitis syndrome[40] and fibromyalgia syndrome.[39] Although the causes of postpoliomyelitis syndrome and fibromyalgia are still unclear, it is possible that a reduction in growth hormone secretion with a resultant disruption of normal muscle repair and axonal sprouting can contribute to the coexistence of these two conditions and to the symptoms of muscle pain, fatigue, and weakness in some patients with past poliomyelitis.

In conclusion, fibromyalgia syndrome is common in a postpoliomyelitis clinic and appears to be an important contributor to new symptoms (especially fatigue and pain) in this patient population. The demographic characteristics of postpoliomyelitis patients with fibromyalgia syndrome are similar to those of fibromyalgia syndrome in other populations. Specific management of fibromyalgia syndrome should be incorporated into the treatment of patients with past postpoliomyelitis.

Accepted for publication June 23, 1994.

This work was supported by the Fonds de la Recherche en sante du Québec, Montreal, and by the Polio Québec Association, Montreal.

We are indebted to our patients for participating in the study and to the reviewers for their constructive criticism.

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Document preparation: Chris Salter, [Original Think-tank](#), Cornwall, United Kingdom.

Document Reference: <URL:<http://www.zynet.co.uk/ott/polio/lincolnshire/library/trojan/fibromyalgia.html>>

Created: 21st September 1998

Last modification: 5th February 2010.

