

CONCISE REPORTS

Comparative study of the skin pathergy test with blunt and sharp needles in Behçet's disease: confirmed specificity but decreased sensitivity with sharp needles

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Abstract

Objective—To compare the specificity and sensitivity of the skin pathergy test performed with blunt and sharp needles in patients with Behçet's disease.

Methods—The skin pathergy test was performed using the simultaneous four needle prick method with blunt and sharp, thick and thin needles in 92 patients with Behçet's disease, 64 healthy controls, and 128 patients without Behçet's disease. The test was evaluated at 48 hours.

Results—No positive skin pathergy test was found in healthy controls and patients without Behçet's disease. The frequency and intensity of the positive skin pathergy test with blunt needles were significantly higher than those with sharp needles.

Conclusion—This study reconfirmed the specificity of a positive skin pathergy test for Behçet's disease using blunt and sharp needles and showed a decreased sensitivity and intensity of the reaction with sharp needles.

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Behçet's disease, which was first described by Behçet, a Turkish dermatologist, in 1937,¹ is a multisystemic inflammatory disorder characterised mainly by vasculitis. The skin pathergy test (non-specific skin hyperreactivity, needle prick test), first reported by Blobner,² is the skin hyperreactivity associated with erythema, papules or pustules which is induced by intradermal prick in some patients with Behçet's disease. In most studies the skin pathergy test has been performed using either an intradermal injection of physiological saline or a sterile needle prick, or both, without reporting the size and sharpness of the needles.^{3 4} The simultaneous application of multiple needles is rarely used.^{4 5} Many investigators read the skin pathergy test at either 24 or 48 hours and evaluated the test as positive by taking into account the formation of erythematous papules or pustules at the prick site, whereas others considered only the

erythema or papule.^{4 6} The test was assessed semiquantitatively from zero to 3+ by some workers.^{5 7 8} As we had noticed some methodological discrepancies in the reports of the test and had also had some difficulties in the standardisation and evaluation of the test we carried out a prospective study to standardise and evaluate the skin pathergy test in healthy controls, patients without Behçet's disease, and in patients with Behçet's disease.⁹ That study showed the high specificity and high sensitivity of the test in Behçet's disease and therefore we included the positive skin pathergy test in our diagnostic criteria as a separate criterion.¹⁰

We noticed that the frequency of a positive skin pathergy test in our patients with Behçet's disease decreased markedly after the introduction of disposable needles in Turkey in 1986. We thought that the higher sensitivity of the skin pathergy test in our previous study might have been due to the use of the non-disposable, resterilised blunt needles. For this reason we have conducted a prospective study to compare the prevalence of a positive skin pathergy test by using sharp and blunt needles in our patients with Behçet's disease and the preliminary results were reported in 1990.¹¹ The purpose of this paper is to present the results of the completed study.

Patients and methods

The skin pathergy test was performed in 92 patients with Behçet's disease fulfilling our criteria¹⁰ and those of the International Study Group.¹² The demographic features of patients with Behçet's disease were as follows: number of men, 51; number of women, 41; mean age, 33.2 years (range 16–59); mean age at onset, 25.4 years (range 19–51); and mean duration of Behçet's disease, 8.5 years (range three months to 32 years). The test was also performed in 64 sex and age matched healthy controls and 128 patients without Behçet's disease (29 with rheumatoid arthritis, five with ankylosing spondylitis, 11 with systemic lupus erythematosus, four with progressive systemic sclerosis, two with dermatomyositis/poly-

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Table 1 Results of a skin pathergy test in 92 patients with Behçet's disease. Results given as No (%) of subjects

SPT	Blunt needles				Sharp needles			
	IV ₁	SC ₁	PS ₁₈	SC ₁₈	IV ₁	SC ₁	PS ₁₈	SC ₁₈
Negative	41 (45)	31 (34)	70 (76)	34 (37)	67 (73)	72 (78)	75 (82)	77 (84)
Suspect*	10 (11)	17 (19)	5 (5)	17 (19)	7 (8) ^e	10 (11) ^f	5 (5) ^g	5 (5) ^h
Positive	41 (45) ^a	44 (48) ^b	17 (19) ^c	41 (45) ^d	18 (20)	10 (11)	12 (13)	10 (11)

a v e, p<0.01; b v f, p<0.001, c v g, p>0.05; d v h, p<0.001.

Abbreviations: SPT = skin pathergy test; IV₁ = intravenous prick with No 1 needle; SC₁ = subcutaneous prick with No 1 needle; PS₁₈ = physiological saline injection into the skin with No 18 needle; SC₁₈ = subcutaneous prick with No 18 needle.

*As suspect reactions with sharp needles are specific for Behçet's disease, we compared the positive results with blunt needles with the sum of positive and suspect results with sharp needles (that is, e = 25 (28%); f = 20 (22%), g = 17 (18%), h = 15 (16%)).

myositis, six with vasculitis, 30 with ulcerative colitis, two with Crohn's disease, six with familial Mediterranean fever, seven with various haematological disorders, 14 with various malignancies, and 12 others).

For the skin pathergy test we used the simultaneous four needle prick method with blunt (used, resterilised) and sharp (unused, disposable) hypodermic needles of two sizes: 20G = No 1, 26G = No 18. After cleaning with alcohol, venepuncture was performed with a 20G needle (IV₁), two subcutaneous pricks with 20G (SC₁) and 26G (SC₁₈) needles (at least 3 mm deep), and one intracutaneous injection of 0.1 ml physiological saline with a 26G needle (PS₁₈). The test was applied to a hairless avascular area of the skin on the flexor aspect of the forearm and the needles were inserted obliquely without rotation almost two centimetres apart on the midline by one of two trained laboratory technicians. The blunt and sharp needles were applied separately to each arm. As we had found the test to be positive at 24 but not at 48 hours in some of the healthy controls and patients without Behçet's disease in our previous study, and we had also observed the same results with sharp needles since that study, each test was only read at 48 hours by two researchers blindly according to our previous guide.⁹ The test was evaluated as an agreed result of the two observers as negative, suspect, or positive (from 1+ to 4+). For statistical purposes we scored the intensity of the reaction as zero for negative, 0.5 for suspect, and 1-4 for 1+ to 4+ respectively.

For the statistical analysis, Student's *t* test, the paired *t* test, and the χ^2 test were used.

Results

The results of the skin pathergy test in healthy controls and patients without Behçet's disease were similar. No positive skin pathergy test was found with the sharp or blunt needles. The suspect reaction was not observed with the sharp needles, although it was observed with the blunt needles using the IV₁ and SC₁ methods (5 and 6% of subjects respectively) in healthy controls, and by the IV₁ and SC₁ methods in 2% of the patients without Behçet's disease. Table 1 gives the skin pathergy test results in 92 patients with Behçet's disease. As we observed suspect reactions in patients with Behçet's disease, patients without Behçet's disease, and healthy controls with blunt needles, and only in patients with Behçet's disease with sharp needles, a suspect reaction with sharp needles was accepted as 'positive'

Table 2 Mean (SD) intensity scores of positive skin pathergy test with four different methods

Methods*	Type of needle		p Value
	Blunt	Sharp	
IV ₁	1.29 (1.35)	0.42 (0.94)	<0.001
SC ₁	1.33 (1.27)	0.42 (1.01)	<0.001
PS ₁₈	0.61 (1.13)	0.18 (0.49)	<0.001
SC ₁₈	1.19 (1.27)	0.18 (0.50)	<0.001

Blunt v sharp needles by each method, p<0.001; SC₁ (blunt) v SC₁₈ (blunt), p>0.05; SC₁ (sharp) v SC₁₈ (sharp), p = 0.051. IV₁ = Intravenous prick with No 1 needle; SC₁ = subcutaneous prick with No 1 needle; PS₁₈ = physiological saline injection into the skin with No 18 needle; SC₁₈ = subcutaneous prick with No 18 needle.

and specific for Behçet's disease. Therefore we compared the positive skin pathergy test results with blunt needles with the sum of the suspect and positive results with sharp needles. The frequencies of the skin pathergy test by the IV₁, SC₁, and SC₁₈ methods using blunt needles were significantly higher than those with sharp needles. The frequency of the positive skin pathergy test with blunt needles ranged from 19 to 48%, whereas this ranged from 16 to 27% with the sharp needles.

Table 2 gives the mean intensity scores of the reaction by the four methods. The scores of the reaction with blunt needles were significantly higher than those with sharp needles at each prick site (p<0.001). By using sharp needles the mean intensity scores of the reaction by the IV₁ and SC₁ methods were similar and higher than those with the PS₁₈ and SC₁₈ methods. Comparing the results of the SC₁ and SC₁₈ methods (using needles of different thickness by the same route), the blunt and thick needles caused more intense reactions than the sharp, thinner needles (p = 0.051).

Discussion

Different aspects of the skin pathergy test have been studied by many workers since 1937 and it is accepted as an important tool in the diagnosis of Behçet's disease. Although some workers found the test to be positive in all of their patients, the prevalence of a positive skin pathergy test in Behçet's disease varies between countries and from one investigator to another (for example, by more than 60% in Turkey, Iran, and Tunisia, and less than 20% in the United Kingdom and USA).^{3 6 7 9 12} The skin pathergy test was negative in a small number of healthy subjects in two studies.^{6 13} In some studies a few patients without Behçet's disease were reported to have positive reactions, but it is not known whether or not they later developed Behçet's disease.^{6 14 15}

Our previous study of the skin pathergy test using the same method as the present study but using only blunt needles in 152 patients with Behçet's disease, 240 patients without Behçet's disease, and 122 healthy controls showed the following important features: the frequency of a positive skin pathergy response was 67% with SC₁, 63% with IV₁, 60% with SC₁₈, and 40% with PS₁₈; the intensities of the reactions at the four prick sites were not homogeneous in almost half of the patients with Behçet's disease; even over short time periods the test could change from positive to negative and rarely from negative to positive; with a few exceptions a positive skin pathergy test did not correlate well with the various demographic and some clinical features; although some of the healthy controls and patients without Behçet's disease had a positive skin pathergy test at 24 hours, none had a positive reaction at 48 hours; our previous study of the skin pathergy test in the relatives of 48 probands showed that a positive skin pathergy test was observed in some of the first degree healthy relatives of the probands¹⁶; and considering the high specificity and high sensitivity of the pathergy phenomenon in Behçet's disease, we included a positive skin pathergy test in our set of diagnostic criteria as a 'specific criterion'.¹⁰

Our present study, in which blunt and sharp needles were used simultaneously for the skin pathergy test, not only confirmed some of these results of our previous study but also emphasised further features of the pathergy phenomenon. We could not find any positive skin pathergy test in healthy controls and patients without Behçet's disease, and therefore the high specificity of the test was confirmed once more. A significant decrease in the sensitivity and intensity of the skin pathergy test with sharp needles was observed; as even small papules with erythema (the so called 'suspect reaction' in our previous study) with sharp needles was seen in patients with Behçet's disease but not in the controls, it was accepted as a positive reaction. As a significant influence of the sharpness of the needles on the intensity of the pathergy reaction was observed, we modified our previous grading definitions accordingly (table 3).⁹

The use of blunt needles before 1986 in Turkey may explain the higher prevalence of a positive pathergy test in the past. This has also

been suggested by another group in Turkey.¹⁷ The same problem may occur in other developing countries (for example, Iran, Tunisia, Morocco, and Algeria). Furthermore, the lower prevalence of the skin pathergy test in developed countries might also be related to the long term use of disposable needles.

In conclusion, a positive skin pathergy test at 48 hours is specific for Behçet's disease. Positive reactions are more common and intense with blunt needles than with sharp needles. We suggest that two or more simultaneous subcutaneous pricks with thick needles (e.g. 20G = No 1) should be used for the skin pathergy test and we suggest that if standardised blunt needles can be made, the sensitivity of the test will be increased further.

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Table 3 Grading and definitions of skin pathergy test

Grades of SPT*	Characteristics of the pathergy reaction at 48 hours	
	Blunt needles	Sharp needles
Negative (-)	Only erythema or trace of prick	Only erythema or trace of prick
Suspect (±)	Papule <2 mm + erythema	
Positive (+)		
1+	Papule 2-3 mm + erythema	Papule ≤3 mm + erythema
2+	Papule >3 mm + erythema	Papule >3 mm + erythema
3+	Pustule 1-2 mm	Pustule 1-2 mm
4+	Pustule >2 mm	Pustule >2 mm

*SPT = Skin pathergy test.