In a project conducted at the Medical Center of Central Massachusetts, in conjunction with the Massachusetts Department of Mental Health, board-certified psychiatrists interviewed patients over a video link regarding suicidal ideation, imminent suicidal intent, homicidal ideation or intent, active delusions, hallucinations, or gross impairment of judgment. Ratings on multiple scales, which culminated in determination of the need for involuntary commitment, were independently completed by a psychiatrist in the room with the patient and the interviewer at the remote telemedicine site.

In 12 evaluations, the mean weighted kappa coefficient for the two raters on the eight clinical scales was 0.85 ($F=20.85$, $df=95, 95$, $p<0.001$). According to the criteria of Landis and Koch (3), this result indicates "very good" agreement between raters. For determining the need for involuntary commitment, there was perfect agreement between raters (kappa= 1.00); 50% of the patients met the Massachusetts commitment criteria. After the evaluations, the "in room" psychiatrist conferred with the telepsychiatrist regarding additional information that might have been observed directly but missed by the video link; in none of the 12 evaluations was such an omission noted.

On the basis of this experience and the ongoing monitoring of telemedicine evaluations by videotaping (with patient consent), we have established a system for the telemedicine evaluation of patients at multiple participating facilities. We believe this model both improves the quality of emergency care available to satellite facilities and greatly reduces the cost of this critical service.

REFERENCES

1. Grigsby J: Current status of domestic telemedicine. J Med Systems 1995; 19:19–27
2. Baer L, Cukor P, Coyle JT: Telepsychiatry: application of telemedicine to psychiatry, in Telemedicine: Theory and Practice. Edited by Bashshur RL, Sanders JH, Shanon GW. Springfield, Ill, Charles C Thomas, 1997, pp 265–288
3. Landis JR, Koch GG: The measurement of observer agreement for categorical data. Biometrics 1977; 33:159–174

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Genetic Heterogeneity in Nocturnal Enuresis

TO THE EDITOR: Primary nocturnal enuresis is one of the most common disorders in childhood, with a high prevalence of about 10% among 7-year-old children and even 1% among young adults (unpublished 1994 paper of S. Wille). Formal studies have described a genetic disposition for primary nocturnal enuresis (1). Molecular genetic linkage analyses have shown evidence for genetic heterogeneity of primary nocturnal enuresis, with either assignment or exclusion of assignment to chromosomes 13q, 12q, and 8q (2, 3).

Three German families in whom primary nocturnal enuresis had segregated over two or three generations and who had a child with primary monosymptomatic nocturnal enuresis were included in the study after written informed consent was obtained. The children with primary nocturnal enuresis in the three families were 11, 10 and 6 years old, respectively, and had no additional somatic or psychiatric diagnoses according to ICD-10. Daytime micturition problems were excluded. Uroflowmeter, sonography, urinalysis, and bacteriology results were normal except for a slight prolongation of micturition time in the 11-year-old child of the first family.

The pedigrees of the families showed an autosomal dominant mode of inheritance with high penetrance of primary nocturnal enuresis. Of the five siblings found in the three families, one sister (from the second family) was enuretic. Two of the mothers, one father, and two of the grandmothers had suffered from primary nocturnal enuresis in childhood. The mother in the third family reported current nycturia.

Venous EDTA blood samples were taken from 13 family members. Common antigen microsatellite polymorphisms were detected by polymerase chain reaction by using five microsatellite markers: D13S263, D13S291, D12S80, D12S43, and D8S260. Molecular genetic analyses were performed by comparing DNA polymorphisms with clinical phenotypes.

In the first family, all five microsatellite markers segregated with the disease. In contrast, in the second family, linkage of primary nocturnal enuresis to all three analyzed chromosome intervals could be excluded with high probability, since the two affected daughters inherited different DNA polymorphisms of their affected mother. Finally, in the third family, linkage of primary nocturnal enuresis to chromosome 13q was possible, but linkage to chromosomes 8q and 12q was improbable.

These results support the hypothesis of Eiberg et al. (2) and Dahl et al. (3), who described molecular genetic heterogeneity of primary nocturnal enuresis. In addition to the five markers described one can speculate that other loci would be involved in primary nocturnal enuresis. In the future, we hope that it will be possible to clarify the assignment of the phenotype to specific loci.

REFERENCES

1. Bakwin H: The genetics of enuresis, in Bladder Control and Enuresis. Edited by Kolvin I, MacKeith RC, Meadow SR. London, William Heinemann Medical Books, 1973, pp 73–77
2. Eiberg H, Berendt I, Mohr J: Assignment of dominant inherited nocturnal enuresis (ENUR1) to chromosome 13q. Nat Genet 1995; 10:354–356
3. Dahl N, Arnell H, Hjälmas M: Primary nocturnal enuresis: linkage to chromosome 12q and evidence for genetic heterogeneity (abstract). Am J Hum Genet 1995; 57:1089

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Religion Index for Psychiatric Research

TO THE EDITOR: In 1986, psychiatric researchers called for further investigation of the relationship between religion and mental health (1). While the research is growing, well-designed and theoretically grounded studies in this area remain rare. One reason may be because researchers are uncertain of how to measure religiosity in a comprehensive yet brief and nonoffensive manner.

The Duke Religion Index is a 5-item scale that captures the three accepted major dimensions of religiousness: the organizational, nonorganizational, and subjective or intrinsic religiosity dimensions.

The first item is a measure of the organizational dimension

and asks "How often do you attend church, synagogue, or other religious meetings?" Responses are rated as follows: 1=never, 2=once a year or less, 3=a few times a year, 4=a few times a month, 5=once a week, and 6=more than once a week.

The second item is a measure of the nonorganizational dimension and asks "How often do you spend time in private religious activities, such as prayer, meditation or Bible study?" Responses range from 1 (rarely or never) to 6 (more than once a day).

Items 3–5 are three statements that measure subjective or intrinsic religiosity: "In my life, I experience the presence of the Divine," "My religious beliefs are what really lie behind my whole approach to life," and "I try hard to carry my religion over into all other dealings in life." These statements are rated on a scale from 1 to 5 (1=definitely not true; 5=definitely true).

The first two items were taken from large community and clinical studies conducted in North Carolina. They have been administered to almost 7,000 persons aged 18 to 90, and thus there are normative data on response rates in both clinical and community populations. These measures have been related to physical health, mental health, and social support in opposite ways (the organizational dimension related to better health outcomes; the nonorganizational dimension related to poorer outcomes).

The final three items were extracted from Hoge's 10-item intrinsic religiosity scale (2). The Hoge scale was administered to 458 consecutively admitted medical patients. We used regression analysis to examine the relationship between each item on the scale and depressive symptoms, severity of medical illness, functional status, social support, and speed of recovery from depression. Principal component factor analysis of the 10-item scale revealed two major factors: an intrinsic and an extrinsic factor. Three items from the scale were chosen on the basis of their loading on the intrinsic factor, correlation with the total score, and relationship with health outcomes. The 3-item subscale had a Cronbach's alpha of 0.75; while it was strongly correlated with the original 10-item scale (r=0.85), it was only moderately correlated with the organizational (r=0.40) and the nonorganizational (r=0.42) dimensions. Our resulting index (score range=5–27) captures three dimensions of religiousness that are related in overlapping yet unique ways to social support and different health outcomes.

REFERENCES

1. Larson DB, Pattison EM, Blazer DG, Omran AR, Kaplan BH: Systematic analysis of research on religious variables in four major psychiatric journals, 1978–1982. Am J Psychiatry 1986; 143:329–334
2. Hoge DR: A validated intrinsic religious motivation scale. J Scientific Study of Religion 1972; 11:369–376

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CO_2 Challenge in Nonclinical Subjects

TO THE EDITOR: We read with great interest the 1-year prospective evaluation of nonclinical subjects with no history of spontaneous panic attacks who underwent the 35% CO_2 challenge (1). We agree on the importance of investigating whether laboratory-induced anxiety will induce or "potentiate" panic disorder. These kinds of studies are particularly relevant to test the safety of the 35% CO_2 challenge in the investigation of the pathogenetic mechanisms of panic disorder and in consideration of its possible use as a laboratory diagnostic procedure.

We contacted 34 nonclinical subjects (13 men and 21 women, mean age=29.1 years [SD=4.1]) who previously had been included in a study that examined 35% CO_2 reactivity in panic patients (2). The original group had consisted of 44 individuals, but we were not able to contact 10 of them. The subjects were observed for a mean of 45.9 months (SD=6.1, range=30–53) after the 35% CO_2 challenge. After written informed consent was obtained, each subject was given the anxiety disorders section of the Diagnostic Interview Schedule.

Among these nonclinical subjects, 30 (88%) had never experienced an unexpected panic attack before the challenge and had no history of panic disorder in their family. Four (12%) had shown a positive response to the 35% CO_2 challenge according to a previously defined threshold (3). For these four subjects, the mean values on the Visual Analogue Scale for Anxiety before and after the challenge were 12.8 (SD=14.9) and 16.2 (SD=13.9), respectively, with a mean percentage change in score of -3 (SD=28.1). One of these subjects experienced three panic attacks (but not panic disorder) over a period of 3 years; the first attack occurred 6 months after the challenge. Two subjects had experienced unexpected panic attacks before the challenge, and both had a positive reaction to the 35% CO_2 challenge. One experienced a single panic attack 15 months after the challenge, while the other reported no panic attacks. Two subjects reported a family history of panic disorder. While one had a positive reaction to the 35% CO_2 challenge, neither reported panic attacks after the challenge. No subjects in our cohort developed panic disorder or any other anxiety disorder.

The inhalation of a 35% CO_2/65% O_2 gas mixture was not able to prime panic disorder in nonclinical subjects over a period of 3–4 years, which confirms and extends the findings of Harrington and colleagues (1). This finding thus supports the safety of the 35% CO_2 challenge, at least when administered to nonclinical subjects. Although our report suggests that the 35% CO_2 challenge might be safe also when administered to high-risk subjects, this observation needs to be confirmed in larger study groups that include members of families with panic disorder patients and subjects with sporadic, unexpected panic attacks, in particular those who show a positive response to the 35% CO_2 challenge (4–6). These studies are currently ongoing at our center.

REFERENCES

1. Harrington PJ, Schmidt NB, Telch MJ: Prospective evaluation of panic potentiation following 35% CO_2 challenge in nonclinical subjects. Am J Psychiatry 1996; 153:823–825
2. Perna G, Battaglia M, Garberi A, Arancio C, Bertani A, Bellodi L: CO2/O2 challenge test in panic disorder. Psychiatry Res 1994; 52:159–171
3. Battaglia M, Perna G: The 35% CO2 challenge in panic disorder: optimization by receiver operating characteristic (ROC) analysis. J Psychiatr Res 1995; 29:111–119
4. Perna G, Cocchi S, Bertani A, Arancio C, Bellodi L: Sensitivity to 35% CO2 in healthy first-degree relatives of patients with panic disorder. Am J Psychiatry 1995; 152:623–625
5. Coryell WH: A trait marker for panic disorder (letter). Biol Psychiatry 1996; 39:567
6. Perna G, Gabriele A, Caldirola D, Bellodi L: Hypersensitivity to