In their paper, “Intelligence quotient in children with meningomyelocele: a case–control study,” Nejat and coworkers conclude that although the mean IQ was lower in the group of patients with meningomyeloceles (MMCs) compared with the matched control group, it was higher than the IQs reported in the literature for similar patients. The authors also point out that there were more male than female patients in this study, and that only 46% of these patients required shunt placement for hydrocephalus, which again is different than the ratios reported elsewhere. It is important to point out that this is a highly selected population. All decisions related to the children’s treatment and survival were made by the parents, and the physicians did not (or rather “could not”) have any active role in this regard. The children in this study were also only those who were referred for care. Therefore it seems reasonable to assume that the most severely involved infants would not be treated; in this report, only one child with thoracic-level involvement is included. In many countries, the female infant is less “valued” than the male, and this may explain the sex ratio difference that Nejat and coworkers report. It may also be that children referred for care are from families of a higher socioeconomic class. If one compares Lorber and Saffield’s series of highly selected infants, the IQs they report are much higher, and the incidence of requiring shunt placement for hydrocephalus was much lower than in our own series of unselected infants.2

With respect to Nejat and colleagues’ methodology, the procedures and the degree to which such procedures tell us something beyond what has been studied previously are not explained clearly. What are the hypotheses of the study?

The Raven Progressive Matrices (RPM) test has been used to assess intellectual efficiency or the ability to become more efficient by learning from immediate experiences.3 It is a popular measure in countries outside the US because of its simplicity and ease of use. In addition, this test does not rely on verbal responses or skilled manipulative ability, and verbal instruction is kept to a minimum.9 The test is generally considered culturally fair. The authors should clarify, however, that in using the RPM test they are only assessing one aspect of cognitive functioning—namely fluid intelligence/nonverbal visuospatial reasoning—and consequently, the use of the term “IQ” is misleading. The RPM test scores are not interchangeable with those obtained from intelligence tests that sample a wide range of abilities.

Moreover, the authors should indicate how scores from the Colored Progressive Matrices (CPM) and Standard Progressive Matrices (SPM) tests were transformed into IQs. Traditionally, raw data from these measures are converted into percentile ranks,4,7 not standardized scores as reported in the paper. Although conversion of percentages to standardized IQs is possible, the practice is strongly discouraged.8 The limitations of this statistical procedure and its effect on the estimates of cognitive ability should be noted.

Furthermore, there is incongruity in how the authors classify the IQs they report. Their description of the classification varies from the text to Table 2. Nejat and coauthors state the scores were “below normal, normal, or above normal according to the DSM-IV-TR [Diagnostic and Statistical Manual of Mental Disorders, IV-Revised] guidelines;” however, the DSM-IV-TR classifies “below normal” into mild, moderate, severe, and profound intellectual disability.

How did the authors statistically account for the two versions of the RPM (the CPM and SPM)? Scores from the CPM and SPM tests are not interchangeable as reliability and validity data for these two versions differ. The implications of this fact on the study’s results should be discussed.

There are also significant limitations in the study’s assessment of attention. According to the authors, attention was measured by 1) the frequency of the child’s distraction from the test, and 2) the verbal reasoning given for answering in a particular manner. Do the authors have data concerning the validity and reliability of measuring attention in this manner? Data on interrater reliability, for example, are important in assessing the consistency of the study’s measure of attention. Poor interrater reliability could lead to serious measurement errors. In addition, there are limitations to using a child’s verbal rationale in evaluating attentiveness. This technique assesses much more than just attention; it requires verbal processing and language expression. A child with a verbal learning disability may have difficulty responding to the request to justify his or her answer, but may...
not experience difficulty with general attention during testing. Moreover, there are potential biases in the study’s observational assessment of attention. It is unlikely that the observers were blind to the child’s group (case compared with control). Finally, these observational techniques do not account for the child’s age or level of development.

References


RESPONSE: Since the first report of MMC by Peter Forrestus in 1587,7 numerous authors have discussed the abnormal embryological development, surgical anatomy, associated abnormalities, complications, and high mortality and low survival rates in patients with this deformity. During the last four centuries the recommended treatment for patients with MMCs has progressed from observation to surgery in selected cases, with aggressive treatment being the first choice for almost all newborns with MMCs in developed countries.8 In Iran, this surgery is done only at the request of the parents, so there are significant differences between children’s ages at the time of operation for MMC closure, shunt surgery, and correction of associated complications in our country and those ages noted in other studies from more developed countries. Although there is voluminous literature on the intelligence of children with MMCs in developed countries, no work has been done concerning this issue in Iran. Most families of children with MMCs are so focused on their children’s various physical problems, including paraplegia, hydrocephalus, shunt complications, fecal and urinary incontinence associated with recurrent urinary tract infections, orthopedic deformities, and so on, that psychological problems and learning disabilities are often neglected.

In developed countries these patients’ intelligence levels have been evaluated by applying sophisticated multidimensional psychological tests, but we chose to perform this assessment using the RPM test. Despite the existence of many developed and widely accepted IQ tests such as Wechsler Adult Intelligence Scale–Revised (WAIS-R), the Stanford–Binet, and the Kaufman test, the RPM test was selected due to its availability at our center, its simplicity, and the shorter time needed for its completion. Using either the CPM test for children 5 to 8 years of age or the SPM test for children 8 years of age and older, one can evaluate the general intelligence level of each child.8 The answers were recorded on specific answer sheets and the correct responses were marked in accordance with separate answer keys for the SPM and CPM tests. The total number of correct answers was then matched with normal values according to standard tables and each individual received a score. Both the SPM and CPM tests include a standard table for converting the child’s answer into a score according to age group. These scores are then placed in the corresponding IQ ranges. The IQ was defined by the score obtained according to DSM-IV-TR criteria explained in the books by Kaplan, Sadock, and their colleagues.5,8 The SPM and CPM tests are not interchangeable, of course, but each test has its own series of figures and scoring tables. Results obtained from children who were tested with SPM were scored according to the SPM table, and those children tested with the CPM were scored according to the CPM table. The test choice makes no difference when they are both assigned a score in an IQ range.

The RPM test demonstrates only conceptual ability as the participants require neither verbalization and skilled manipulative abilities nor subtle differentiation of visuospatial information to complete the test. This test can be used effectively to test people with physical disabilities, aphasia, cerebral palsy, or deafness, and people whose intellectual abilities are below normal.6 The RPM test does not assess performance and verbal IQs separately as do the WAIS-R and the Stanford–Binet.3

The level of attentiveness of the child during testing is very important, and was evaluated using two factors:

1) To see if the children were guessing at the answers just to move on without looking carefully at the figures, each child was periodically asked to provide a rationale for his or her selection. This was done once between Figs. 11 and 12 of the CPM test, and twice between Figs. 25 through 50 of the SPM test. Whenever the child answered this request adequately, we were able to infer that the child understood the process fully and was attentive to the task. At times the children pointed to the correct answer but could not explain their reasons for doing so; these children were checked for attentiveness again a few figures later in the test. Because there is the least amount of verbal reasoning required in the RPM test for evaluating IQ, the participant can simply point out the figure or state the figure number.

2) The second criterion we used was the general attentiveness level of each child. Each child was tested in a room with as few distractions as possible. The level of attentiveness was evaluated according to how many times each child seemed distracted from the test and had turned his or her attention to other things in the room such that he or she had to be brought back to the test.

One different person evaluated attentiveness and IQ for the case and control groups and thus there was no interobserver bias. There is no doubt that this way of measuring attentiveness has not been mentioned in the literature before. To our knowledge there is no literature concerning the best way to measure attentiveness. The first criterion we mentioned requires verbal processing for the evaluation of attention. None of the children in our study had a verbal deficit and consequently this type of processing was achievable for all of them. Considering both factors, the children were classified as either attentive or inattentive. The meth-
vod we devised was the only way to maintain the standard of the tests and assess the attentiveness levels of the children in our clinical setting.

Our study is a preliminary assessment performed with limited resources in selected children with MMCs who have survived to undergo IQ testing. The society in which this study was conducted is very different from developed countries in many ways. Still more detailed and systematized efforts are required to evaluate the more specific aspects of IQ and cognition in these children.

**References**

2. Forestus P: De captis et cerebre morbis ac symptomalis, in Observationum Medicinalium. Leiden: ex off Plantiniana, 1587