Family Practice Grand Rounds

An Examination of the Family Physician's Diagnostic Method

Joseph R. Morrissy, MB, ChB
London, Ontario

DR. JOSEPH R. MORRISSY *(Chairman, Postgraduate Education Committee, Department of Family Medicine):* The purpose of rounds today is to examine the diagnostic method used by family physicians. I will be presenting a clinical problem which I recently encountered in my own practice. Our discussion leader and members of the audience will comment on the process by which the problem was solved. The purpose is not to demonstrate any particular clinical entity but to subject our decision-making process to critical analysis.

The patient is a 42-year-old woman who presented to me in August 1976 with a problem list as follows:

1. Family dysfunction leading to a suicide attempt (1971);
2. Obesity (life-long);
3. Pancreatitis (1973);
4. Recurrent bronchitis and asthma;
5. Cholecystectomy (1973);
6. Family history of heart disease;
7. Chemical diabetes (1973);
8. Separated from husband (March 1976).

When I saw the patient she had a four-week history of anorexia, loss of energy such that she was unable to work, weight loss of 35 pounds, and a complaint that she felt tired all the time. She was nauseated after eating but had not vomited. She had no change in stool color.

Dr. McWhinney will complain that he does not have enough information about this patient, but that is his usual opening gambit, so we will ignore it and proceed.

DR. I.R. MCWHINNEY *(Professor and Chairman, Department of Family Medicine)* I would like to clarify one or two things on the problem list. By "chemical diabetes" do you mean an abnormal glucose tolerance test without any clinical evidence, and, if so, what is the abnormality?

DR. MORRISSY: Correct. There is a lag in the clearing of glucose from the blood. Her blood sugar level one hour after a 100 gm load was 132 mg%, at two hours it was 124 mg%, and at three hours it was 102 mg%.

DR. MCWHINNEY: Was there any cause for her pancreatitis in 1973?

DR. MORRISSY: It may have been related to her gallstones. It was not felt that drinking was a problem for her.

DR. MCWHINNEY: How obese was she?

DR. MORRISSY: She weighed 90.5 kg one year ago, and she weighed 77.7 kg one month ago. Her height is 158 cm.

DR. MCWHINNEY: Is she a new patient to you?

DR. MORRISSY: No. I have seen her over a period of three years.

DR. MCWHINNEY: Well, this in itself is a difference between our discussion now and what happens to the family physician in his office. When Dr. Morrissy saw this patient, he had a mental picture of her and a store of knowledge about her which we do not have. However, we can allow for that.

I am just going to imagine that she comes with these new complaints. The first thing that strikes me is that this is a severe loss of weight, and I would wonder if it is accurate. That is my initial reaction to a patient complaining of weight loss. One gets many complaints from people who say they have lost weight, but when you really go into it they have lost much less than they think. They have not weighed themselves and are just judging by impressions. I would look for additional evidence of weight loss such as whether her clothes are loose. I would also expect visual evidence: I would expect to see a change in her.

DR. MORRISSY: The scales provide the evidence. She weighed 90.5 kg one year ago, and now she weighs 77.7 kg. She is so big that one's clinical impression about loose clothing is unreliable.

DR. MCWHINNEY: Well, that is the best evidence of all. We are sure that she has, in fact, lost the weight. In the presenting complaints I can identify a number of cues which even at this stage set me thinking along certain lines. These cues are: (a) weight loss, (b) loss of appetite and nausea after

From the Department of Family Medicine, University of Western Ontario, London, Ontario. Requests for reprints should be addressed to Dr. Joseph R. Morrissy, St. Joseph's Hospital Family Medical Centre, 362 Oxford Street East, London, Ontario N6A 1V8.

meals, and (c) malaise. These cues enable me to form one or two tentative hypotheses; when I am confronted with major weight loss I think of three things: (1) hyperthyroidism, (2) diabetes mellitus, and (3) malignancy. Another hypothesis, arising from the anorexia, is that she has hepatitis. That could also cause the weight loss and should be added to the original list.

DR. MORRISSY: If anyone disagrees with this and wishes to add to it, please do not hesitate to speak.

DR. CUTBUSH *(senior resident):* One thing I think of with weight loss is chronic infection or tuberculosis.

DR. R. BAXTER *(Assistant Professor, Department of Family Medicine):* I think I would add a psychosocial etiology. She is very unhappy and could be depressed, with anorexia and nausea leading to weight loss.

DR. MCWHINNEY: I would have to agree with that. It was in my mind but unstated. I would bring it into the problem search fairly early if there was little support for the original group of hypotheses.

DR. BAXTER: I think I would also want more information. At an earlier stage you inquired regarding pancreatitis. Has she really not been drinking for these three years?

DR. MCWHINNEY: Now you are talking about the search. My original questions relate to the information I have been given, and I am talking about the hypotheses that I formulate before I ask the patient a question.

DR. JOHN BIEHN *(Associate Professor, Department of Family Medicine):* I would like to question that statement. I wonder if in circumstances like this we do start putting down diagnostic hypotheses in our minds before we ask questions.

DR. MCWHINNEY: I can only talk about what I do. I know I start thinking as soon as the patient walks through the door. They may not be diagnostic hypotheses, but they are, at least, broad categories or anticipations.

DR. BIEHN: I am sure I am influenced by my impression of the patient. Is she ill or well? Maybe it is just intuition! The physician's past knowledge influences him. When a patient presents with a new, seemingly significant problem, the first thing to do is look at her.

DR. MCWHINNEY: But I can't do that at this time.

DR. MORRISSY: However, that *is* part of our diagnostic process. When you are given information about a patient, you automatically have a certain "set." On being told that she was here with weight loss and malaise and is not working, my first reaction before seeing her was that she was depressed. The first thing I did upon entering the room was look at her to see if she appeared depressed.

DR. MICHAEL DILLON *(Clinical Lecturer, Department of Family Medicine):* I would like to ask Dr. Biehn a question. Does the name of this patient conjure up anything to you, even though she is not your patient?

DR. BIEHN: Certainly. "Not her again!" If I had been about to see her, I would have had a preformed impression also that she is depressed.

DR. MORRISSY: That is obviously very important in the diagnostic process.

DR. MCWHINNEY: An important point to establish now is whether or not she was trying to lose weight.

DR. MORRISSY: The way I understood it was that this lady wanted to eat, but could not do so.

DR. BAXTER: Combining these complaints with your previous knowledge of this patient, you may well conclude that the patient is sick. So now you sit down and take a functional inquiry like an internist.

DR. MCWHINNEY: I would question Dr. Baxter's use of the comparison to an internist, with the implication that we are different. I do not believe that there is a difference in this respect between internists and ourselves. All clinicians begin by formulating hypotheses. When taking a history, the mind is not a blank. One continually formulates, revises, and rejects hypotheses. The main difference between an internist and a family physician doing this is likely to be the previous knowledge of the patient held by the general practitioner. This information influences the hypotheses formulated.

I think that what we are talking about is trying to formulate the patient's illness into a number of broad categories. With many of the illnesses we see, we don't have to go beyond broad categories. With a patient who has vomiting and diarrhea for 24 hours, for example, we do not need to know *exactly* what the illness is, but we do need to know what illness it is *not*. Once we make up our minds about that, the probability is that it is self-limiting and harmless. That is an example of a very broad category.

Now, in a case such as this, it is likely that we will have to continue the search until we know what the patient's illness is with some precision. Our search may vary little from that of the internist. I would want to be careful to avoid any suggestion that our methods are less thorough than the internist's. They are not. The thoroughness of the search is the same, but it is usually applied to a different set of problems, and in a context of continuing care.

Dr. Morrissy made a hypothesis before he saw the patient. Let us examine what happened to that hypothesis.

DR. MORRISSY: My immediate reaction, on seeing her, was that she was not depressed. I did not think she was depressed because she smiled, was apparently pleased to see me, and made good eye contact with me. She looked ill, her face was pale, and I thought there may have been a lemon-yellow tinge to her complexion.

DR. MCWHINNEY: Even as I started my history-taking, those would be some of the cues I would be seeking. In my search, including the history, the physical examination, and the laboratory investigations, I would use "tests" that would enable me to validate or invalidate my hypotheses. "Tests" include items in all three areas: history, physical, and laboratory. I would look for identifying features of any of the disease categories I have mentioned. I would be looking for evidence of high utility. A high utility test is one which can discriminate effectively between categories. A high utility test, for example, would be the presence of glycosuria with a hypothesis of diabetes mellitus, when weight loss is a symptom.

With this patient I would look for evidence of thyrotoxicosis, for example, nervousness, hyperkinesis, tremor, or an obvious stare, before I ever got into the examination. As for hepatitis, I would look at the sclera, and the skin color for possible clues. With regard to the diabetes, I would ask if she had polyuria or polydipsia. I would also want to know if she has fever or pain, particularly abdominal pain.

DR. MORRISSY: She was sitting calmly, concerned, but not agitated or fidgety. She had no exophthalmos.

Her thyroid was not observed to be enlarged. She did admit to two things further. She thought she was running a low grade fever and she complained of vague but constant mid-abdominal pain, which tended to shift to the right. She had not found relief for this. She had no frequency or dysuria.

DR. MCWHINNEY: Are our hypotheses shifting slightly with this new information?

DR. MORRISSY: I think our hypotheses are moving away from diabetes and towards hepatitis because of her color, anorexia, pain, and fever.

DR. BAXTER: I think she might be hemolyzing or have severe pernicious anemia.

DR. BIEHN: What is the discriminatory value of a negative Dipstix test on the urine? My thinking is that if diabetes were responsible for the weight loss, she would have 4+ glycosuria.

DR. MCWHINNEY: I agree. I think that our rank order of hypotheses has changed. Now we have infection or malignancy as broad categories at the top of the list. We have moved hyperthyroidism further down. A malignancy could account for the low grade fever equally as well as an infection.

DR. MORRISSY: We also appear to accept that the etiology of her symptoms is not psychosomatic, and that we do not need to explore that pathway at present.

DR. MCWHINNEY: That is going back to an earlier stage: a stage where we made the categorization "organic" or "psychogenic." This is obviously a simplistic thing to do, because many problems have origins in both, but we are thinking here of the main cause of her symptoms.

Now, there are some specific questions to ask in order to test our hypotheses: Has she noticed changes in the color of her stools or urine? Changes in the color of her skin? Has she been a hepatitis contact or had an injection or transfusion?

DR. MORRISSY: The answer to all of those is "no." It is interesting to comment on this, because my mind was made up on the pathway that I was going to follow for this woman. I was sure she had hepatitis or some form of anemia as Dr. Baxter suggested. You have asked some questions which I think are of high utility, but also some less useful ones. To me, it doesn't matter at this point whether or not the patient had injections or transfusions. Those answers give me a clue to the type of hepatitis, if she has hepatitis. I really want to know whether she has hepatitis or not. And, therefore, the high utility tests are questions related to the color of the stool and the urine.

DR. BIEHN: I would agree with that.

DR. MCWHINNEY: I think this brings out another point. The more one looks at the way clinicians solve problems, the more one realizes that there is no one correct way to proceed. There are correct principles, and there may be wrong methods, but each individual develops his or her own style. There may be one correct solution, but there are a number of different pathways leading to it.

DR. DILLON: Where precisely is the pain, and what did you do next to help solve the problem?

DR. MORRISSY: The pain was lateral to the upper right paramedian scar and was constant; it was not epigastric. At this point, I examined her briefly. I looked at the sclera, which were not icteric. The conjunctivae, the tongue and the mucous membranes, and the palmar skin creases were pale; I estimated that the hemoglobin was less than 10 gm. Abdominal examination was negative, except for the previously noted scar. At this point I formulated a problem list as follows: (1) weight loss; (2) anemia, not yet diagnosed. My plan was to rule out gastrointestinal bleeding, pernicious anemia, and hepatitis.

DR. MCWHINNEY: I could not disagree with that, although I think I would have taken a little while longer to examine the thyroid, the major lymph gland regions, and the chest and heart.

DR. BAXTER: I would have done a rectal exam and tested the stool for blood, in addition to the examination mentioned by Dr. McWhinney.

DR. MCWHINNEY: I do not think that that is a very discriminatory test in early pernicious anemia. I think one can do a blood count very quickly, which would be far more discriminatory.

DR. BIEHN: I am not sure that I would have done the stool exam. Leaving it out gives the impression of not being thorough, but your experience may be that further examination at this point is not helpful. I don't know where this woman fitted into your schedule, but I imagine she had a fifteen-minute appointment and you were dealing with a problem you did not anticipate. You cannot spend an hour with her and turn off all the other office patients. You have to come to a quick, accurate assessment.

DR. MORRISSY: I wonder if the clinical clerks and residents would agree with that.

DR. MCWHINNEY: You are only talking about a stage in the search. You are not saying that you will not complete the examination at the next visit.

DR. BIEHN: I think that the abdominal exam was indicated, but beyond that you must try to be fair to the other patients as well as to this patient. At the end of fifteen minutes, it seems reasonable to order some blood and biochemical tests, and bring her back in four or five days. There has to be a compromise and I guess that is where experience comes in.

DR. DILLON: The physician's actions are tempered by his first impressions. He walks through the door and decides that this is an organic problem; the next question he asks is, "Does it matter whether this is done today, tomorrow, or next week?"

DR. GERARD HEVERN *(first-year resident):* When you have already spent ten minutes getting this information, and you know there are four more patients in the next hour, how do you exclude a review of the systems? When you have cues about a patient's illness but don't have time to deal with them, how do you decide whether to proceed or to ask the patient to come back?

DR. MORRISSY: Well, there are a number of ways. The first is that suggested by Dr. Dillon. Ask yourself, "What will be the consequences of not dealing with a particular question at this time? Is delay likely to seriously jeopardize the patient's condition?" There are times when a patient makes a "throw away" remark and the caring physician, in spite of the four waiting patients, has to say to himself, "I must continue with this patient, even if I get one hour behind." In family practice, even with an appointment system, one cannot schedule precisely how one's day will run, because these things occur frequently.

DR. MCWHINNEY: In a case where a serious problem is manifest, I have to

be prepared to adjust my time.

DR. BIEHN: There is an element of anxiety in this. The sort of thing I am suggesting is that you must consider how the patient is feeling. You should convince the patient you are at least on track: that you know where you are going and that the problem can be resolved. If you suspect that the patient expects a full examination, for example, I think you should inform him that there is not sufficient time to do this properly and that you would like him to return in a few days. It is important that the patient should not go away feeling "How can he know what's wrong with me, he did not examine me."

DR. MORRISSY: What should now be done to help sort out this patient's problem?

DR. MCWHINNEY: I think that we are now talking about the end point of the search on this particular occasion. It should be obvious that this is a difficult and important decision. I would define the end point as the point at which one can make an important decision without avoidable risk to the patient. The decision may be about investigation or about management.

What would I do? We are at the stage of investigation. We cannot make decisions about management yet. So, first I would test the urine and I would want a white blood cell count and differential, hemoglobin and hematocrit levels, together with red blood cell indices and a blood film. I would also order a sedimentation rate, and bilirubin and liver function tests.

I think there are two alternative strategies to test the same hypothesis. One must take into account the error rate of the tests that are ordered, as well as the risk attached to each test. One must also take into account the risk of not establishing the diagnosis straight away.

DR. MORRISSY: The results of those investigations were as follows: hemoglobin 7.3 gm%; mean corpuscular hemoglobin concentration 33%; mean corpuscular volume 116; hematocrit 22%; sedimentation rate 48 mm/hr. Westegren; white blood cell count 3,300 cu/mm, with a normal differential; bilirubin 1.3 mg% (within normal limits); SGOT and alkaline phosphatase were both normal; lactic dehydrogenase 2,632 (upper normal is 324).

DR. MCWHINNEY: Does it appear to be a normochromic anemia?

DR. MORRISSY: The peripheral blood film shows anisocytosis, poikilocytosis, and polychromasia. There is a marked neutropenia. This smear is so typical of pernicious anemia that anyone who is not satisfied that they could diagnose this disease from a blood film should really go down to the laboratory and study it. The red cell indices and the raised LDH, together with the peripheral blood film, are strong evidence for me that this patient has pernicious anemia.

DR. BAXTER: But, let us not fall into a trap. You are saying she has pernicious anemia but what about her bellyache?

DR. MORRISSY: I don't think we have forgotten it. If you remember, I wrote down at the end of the first visit that one of the things to do was to exclude gastrointestinal bleeding. I ordered stools for occult blood and they were negative.

DR. MCWHINNEY: There is another clue in this diagnosis for us. The fact that she has pernicious anemia poses special risks for this patient.

DR. MORRISSY: The first risk became apparent at the next visit, when she volunteered that one of her hands felt numb, and she complained of tingling in her hands and feet.

DR. DILLON: What did you do next?

DR. MORRISSY: I ordered a serum B_{12} and folate estimation, and also did a bone marrow biopsy. This revealed a megaloblastic form of erythropoiesis, when examined that day. I went ahead and treated her with vitamin B_{12} intramuscularly, without waiting for the laboratory results.

DR. HELGA HOLST *(second-year resident):* Did you by any chance order a barium meal?

DR. MORRISSY: Why do you ask?

DR. HOLST: Because there is an association between pernicious anemia and a higher incidence of gastric cancer.

DR. MCWHINNEY: That is one of the risks of which I was thinking before.

DR. MORRISSY: I was very conscious of this and this was one of the reasons that I ordered the stools for occult blood. I wanted to know if she was bleeding or not. But, I also felt that if she had gastric cancer, in addition to pernicious anemia, an early diagnosis of this was not going to make any difference to the outcome of the illness. If her symptoms were solely due to the anemia, then they would disappear with treatment. If, however, the symptoms were due to gastric cancer, then I did not feel that that would change the course of her illness significantly. So, I decided to wait and see.

DR. MCWHINNEY: So that, when you found out she had pernicious anemia, you immediately picked up another cue. You realized that she might have cancer also. You also tested that hypothesis with a therapeutic test. If she improves, she probably only has anemia. If she continues to go downhill, you will try to confirm a diagnosis of cancer.

DR. HOLST: I would prefer to be more academic than that. I would prefer to see an x-ray now.

DR. MCWHINNEY: What is the error rate of a barium meal?

DR. HOLST: I'm not sure.

DR. MORRISSY: A standard barium meal misses at least 20 percent of lesions present at the time of the examination, which is a poor discriminatory test.

DR. MCWHINNEY: It is not for me to say that either of these strategies is wrong. But, we are talking about alternative strategies to test the same hypothesis. You can argue about which is correct, but in choosing either one you have to take many things into account. The error rate of your test is one of these, as is the risk inherent in the test itself. Risk of not establishing an immediate diagnosis is another, and this is what Dr. Morrissy was thinking of. He is using time and therapy as a test.

DR. HOLST: Could pernicious anemia by itself cause all of those symptoms?

DR. MCWHINNEY: Yes it could. It can also give gross weight loss and loss of appetite. And it is very difficult to distinguish from cancer of the stomach.

DR. MORRISSY: We could probably go on for a long time discussing various ways of continuing with the investigations and management of this patient. However, from the point of view of today's round, we have discussed the diagnostic method and some of the factors which influence that method. I think we should now conclude.