Commentary

The demise of the minimum database

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During my internship training at the Animal Medical Center in 1988, I was taught that a minimum database of diagnostic testing should be recommended for any patient deemed to be seriously or critically ill. Most of these patients had been brought to the hospital because of a loss of appetite, lethargy, weight loss, weakness, or collapse. The minimum database at that time included a CBC, serum biochemical profile, urinalysis, thoracic and abdominal radiography, and for cats, measurement of serum thyroxine concentration and testing for FeLV and FIV infection.

Although the wisdom of or basis for these recommendations was not clear to me at the time, I tried to follow my mentor's teachings and faced peer pressure if I did not. I recall a fellow intern who admitted a dog that had sustained vehicular trauma but did not recommend or perform abdominal radiography. The animal died the next morning, and an autopsy revealed uroperitoneum secondary to a ruptured urinary bladder. If I wasn't convinced of the value of obtaining a minimum database before seeing this case, I was soon after.

As the principal of a referral emergency and specialty hospital, I have interviewed recent veterinary graduates regularly over the past 15 years. During each interview, I offer the following scenario and ask the individual what actions he or she would advise:

> A 5-year-old neutered male Pug is brought to you on an emergency basis because of an acute onset of lethargy and declining appetite. The owner is very concerned and relays to you how subdued the dog is compared with normal. Physical examination reveals only mild pyrexia. The owner tells you the dog is an important family member and finances are not a concern.

In almost every instance in the past seven years, the young veterinarian has suggested performing a CBC and serum biochemical testing. When I respond that testing reveals only mild neutrophilia, only about half the candidates will then suggest obtaining radiographs either later that night or the next day, while the remainder suggest providing supportive care and assessing patient response. If I ask the candidate why radiographs and a urinalysis were not advised initially, he or she typically answers that there was no indication for these tests on the basis of history or physical examination findings.

I believe that over the past 5 to 10 years, obtaining a minimum database as a starting point for diagnostic testing of sick patients has fallen out of favor. Before we examine the causes and consequences of its decline, let's consider its purpose.

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Merits of the Minimum Database

Although there seems to be little published research on the benefits of obtaining a minimum database of diagnostic testing in sick veterinary patients, several rationales for doing so can be advanced.

First, the minimum database provides a framework to ensure that standards for diagnostic testing of sick patients are consistent among veterinarians. Particularly for multidoctor practices, reducing doctor-to-doctor variability in diagnostic approach seems a reasonable goal, and such an approach would, I believe, serve training programs as well.

Second, the minimum database represents a battery of tests most likely to result either in a diagnosis or in the establishment of a presumptive diagnosis on the basis of exclusion. In my experience, the minimum database allows me to determine a diagnosis or presumptive diagnosis in approximately 70% of sick patients.

Third, patients often have more than one disease, and the minimum database helps in identifying all of the conditions present. As an example, I recently examined a geriatric cat that had been evaluated by its primary veterinarian for weight loss. Laboratory testing revealed high thyroid hormone concentrations, but the cat did not improve over the next four weeks despite treatment with methimazole. At the time of referral, ascites secondary to abdominal neoplasia was confirmed via ultrasonography.

Fourth, the risks to patients of obtaining a minimum database are negligible, whereas diagnostic efficiency is improved, in contrast to a stepwise approach (ie, performing tests individually over several days).

Drawbacks of the Minimum Database

The most important potential concern to obtaining a minimum database of diagnostic testing in every sick patient is client cost. The overall cost of diagnostic testing associated with the minimum database is likely to be higher than the cost associated with a step-by-step diagnostic approach.

Also, although the risks associated with obtaining a minimum database are minimal, they are present. For example, performing radiography in dyspneic cats has the potential to worsen the dyspnea or other conditions, although the risk would seem to be diminished now that many clinics have adopted digital radiography.

In addition, obtaining a minimum database may create client displeasure when all of the test results are

negative or normal. Experienced clinicians know reporting that results of diagnostic testing were normal will occasionally result in owners wondering why the veterinarian persuaded them to perform all those tests; replying that the negative results tell us that the animal is healthy does not always change the owner's demeanor.

Finally, obtaining a minimum database can yield unexpected results, and a decision must then be made as to whether to pursue these findings, particularly when they may not be relevant to the initial reason for evaluation.

The Case for the Minimum Database

Some veterinarians feel ill at ease advising a battery of tests for patients whose condition appears stable. Consider, however, what has to occur for a client to make an appointment to bring an animal to the hospital. Most importantly, the owner must first recognize that the animal is ill or behaving in an unusual manner. Because our patients cannot directly communicate or complain about pain, headaches, nausea, or weakness and because animals are often able to mask signs of disease, owners may not recognize that there is a problem until later in the course of an illness.

Also, many owners, on recognizing that something is wrong with a beloved pet, will retreat into denial, causing them to delay making an appointment. And, because of concerns about the cost of veterinary care, some owners may decide to wait to see whether the problem resolves on its own. Finally, once owners have made the decision to bring their pet to a veterinarian, they must then call and schedule an appointment that suits their schedule, which could take additional time.

Given all of this, the duration of illness for any sick animal may be much longer than is reported or acknowledged. I would argue, therefore, that assuming a conservative posture as an initial diagnostic approach does not demonstrate good reasoning.

Causes of the Demise of the Minimum Database

Many factors have contributed to the demise of the minimum database. Of particular concern is that with the onset of the Great Recession in the late 2000s, veterinarians who did suggest obtaining a minimum database of diagnostic testing were apt to find that higher percentages of owners declined than when disposable incomes were higher. Likely, many veterinarians feel awkward offering procedures that clients decline, and it would be a natural response, when clients regularly decline our advice, to stop offering the minimum database to all owners of sick pets.

In addition, when I completed my internship and residency, one could be reasonably certain that any veterinarian who had completed postgraduate training would have been trained to recommend that a minimum database be obtained for any ill patient. This may no longer be true, as when I have asked newly trained veterinarians why a step-by-step diagnostic approach was advised in select cases, I have been told that their training programs advocated this approach as a way to spend as few client resources as possible. It seems to me that many veterinarians, either as a result of training or a personal opinion of what is most important to clients, see protecting client finances as one of their most important responsibilities.

Finally, in my experience, clients are apt to complain when a veterinarian has performed tests that yielded inconclusive results. Clients often conclude that testing was money poorly spent when results are inconclusive. We are viewed by clients as far more responsible for errors of commission (ie, recommending tests that yield negative results) than errors of omission (ie, not recommended testing when it was necessary). As a result, veterinarians may over time develop a conservative diagnostic approach.

Consequences of the Demise of the Minimum Database

There are limitations to what conditions can be diagnosed on the basis of results of a CBC and serum biochemical panel alone, and animals with nonspecific signs of illness for which a diagnosis cannot be determined on the basis of these test results are often sent home to see whether palliative therapy or time alone will yield improvement. Although this may be sufficient for dogs and cats with some illnesses, it results in unacceptable delays in treatment for other animals with serious conditions (eg, an esophageal foreign body). In my experience, I have seen far more morbidity as a result of failure to obtain a minimum database of diagnostic tests than I have from completing this battery of tests.

Beyond this, a step-by-step diagnostic approach may result in clients having to make multiple visits to the veterinarian or an emergency center to resolve their pet's illness, possibly leading to emotional or financial stress. Such an approach may also lead to an increase in the frequency of therapeutic trials with palliative treatments. These trials may be embraced by clients but can delay acknowledgement of inadequate patient response as well as the institution of appropriate treatments, affect patient prognosis because of delayed treatment, provide false hope to owners of animals with terminal or nonresponsive conditions, prolong patient suffering, or interfere with subsequent diagnostic testing. Over the years, I have seen countless cases of hemangiosarcoma that temporarily appeared to respond to antimicrobials and cases of gastrointestinal tract obstructions that temporarily appeared to respond to antacids.

Conclusions

As a result of multiple factors, it seems that the general recommendation of obtaining a minimum database of diagnostic testing in sick patients has been truncated to performing only a CBC and serum biochemical profile. But doing so limits our knowledge regarding our patients and means that many conditions, such as pneumonia, pulmonary metastasis, cardiac disease, esophageal foreign bodies, pericardial effusion, gastrointestinal tract obstruction, abdominal neoplasia, urinary tract infection, urolithiasis, and protein-losing nephropathy, will not be diagnosed or will be diagnosed late.

Although the proliferation of in-house laboratory equipment and digital radiography means it is easier

than ever before to obtain diagnostic test results, we too often are not taking advantage of these resources. I would argue that this trend has resulted in increases in patient morbidity and mortality rates. Further, I argue that in the absence of a minimum database, obtaining true informed consent is not possible because we do not have sufficient information to provide owners an accurate diagnosis or prognosis. It is in our interest and our patients' interest to revisit the value of the minimum database in ill patients and to modify our teaching of veterinary students and interns and our advice to clients. Despite all the dramatic changes in small animal medicine over the past 25 years, the minimum database in sick patients remains as vital and valuable as ever.