Clinical Technique: Techniques in the Practice Diagnostic Laboratory: A Review

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KEYWORDS

• Biochemistry • Culture • Cytology • Hematology • Fecal • Laboratory

Companion avian and exotic animal medicine often stands apart from conventional small animal medicine (eg, dogs, cats) because of the critical condition in which many of these patients present. The "masking phenomenon" that is seen with exotic animals (ie, the natural instinct of prey species to mask signs of illness to avoid predation), along with an owner's lack of knowledge regarding signs of illness in these species, often results in the animal being presented in poor physical condition and requiring rapid medical assessment and treatment.

It is often stated that "necessity is the mother of invention." Consequently, the need to obtain a rapid clinical assessment of these patients has led to the increased use of on-site diagnostic testing by veterinarians treating companion birds and exotic animals. Although this new technology is a significant advancement to the medical services these practices provide, it is not without pitfalls. This article explores the use of on-site veterinary diagnostic testing: advantages and disadvantages of such testing; tests that are performed; type of equipment available; and the need for quality control. Armed with this knowledge, veterinarians treating companion birds and exotic animals can make informed decisions about the level and depth of diagnostic tests they wish to offer, whether to invest in relatively expensive equipment, and how to determine the validity of the test results obtained.

WHY DO ON-SITE CLINICAL PATHOLOGY DIAGNOSTIC TESTING?

Before a decision is made regarding the investment of a machine that performs on-site diagnostic testing, it is advisable for the practitioner to contemplate the advantages and disadvantages of offering this service (**Table 1**). Many of the hematological and biochemical parameters that are assessed in exotic pet medicine can be affected

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Table 1
Advantages and disadvantages of on-site diagnostic laboratory testing

Advantages	Disadvantages
Sample quality is not affected by transport	Costs of equipment and reagents
STAT testing for critical cases	The range of parameters tested may be limited
Sample volume required is often small	Interpretation of the results must be made by the practitioner, rather than by a trained pathologist
The tests selected are often more relevant to birds and exotics	Quality control is important—and often neglected
There is a perception of increased "customer service"	
On-site laboratories can be a profit center for the practice	

by collection, handling, and transport of blood samples. In particular, hemolysis and prolonged contact time with erythrocytes (Figs. 1 and 2) can affect the serum levels of bile acids, bilirubin, lactate dehydrogenase, creatinine kinase, alkaline phosphatase, potassium, calcium, phosphorous, albumin, fibrin, and glucose. Prolonged exposure to anticoagulants (eg, sodium ethylenediaminetetraacetic acid) can cause morphologic changes to both leukocytes and erythrocytes. Any or all of these artifactual changes can affect the clinical interpretation of the diagnostic test results, with the possible result being a misdiagnosis.

Many artifactual changes associated with blood testing can be avoided by careful collection, followed by rapid processing of the sample through a machine in an on-site laboratory. Alternatively, these artifacts can be avoided (or minimized) by the preparation of fresh blood smears at the time of collection. Also, the blood sample contained in the collection tube should be centrifuged immediately after collection, followed by the removal and submission of the plasma without the erythrocytes. However, a larger volume of blood must be collected to obtain the minimum-sized sample of plasma required for wet chemistry analysis: an obvious disadvantage for avian/exotic pet medicine. Some commercial laboratories will dilute a sample that is too small to process in a wet chemistry analyzer, and then adjust the results mathematically to take the dilution into account. Unfortunately, the accuracy of these adjusted results has not been extensively validated in companion avian and exotic animal medicine.

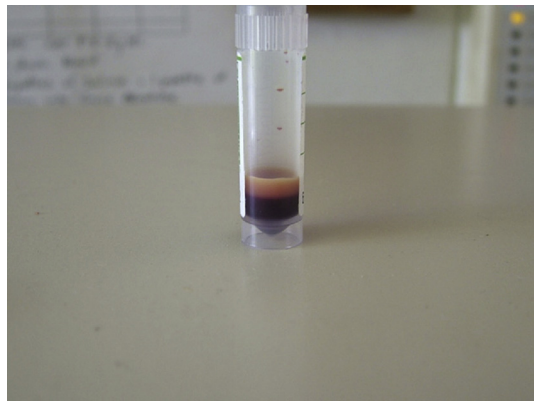

Fig. 1. Microhematocrit tube with spun blood sample collected from a lipemic bird.