Pre-purchase examinations in first year captive-bred falcons

Muller, M.G. and Nafeez, M.J.

Abu Dhabi Falcon Hospital/Environmental Research and Wildlife Development Agency, PO Box 45553, Abu Dhabi, United Arab Emirates

Summary

Pre-purchase examination is not a common veterinary service for birds. However it is performed in psittaciformes for breeding purposes. So far, newly purchased falcons had been examined on a case by case basis after the purchase deal had been concluded. In 2003, the Abu Dhabi Falcon Hospital, as the first hospital of its kind, introduced pre-purchase examination for newly bought falcons as an innovating service to evaluate the health status of falcons prior to purchase as well as to prevent sick falcons from entering large falcon collections. Between 11.08.2003 to 25.01.2004, 220 pre-purchase examinations of first year captive-bred falcons were performed. All 125 Gyr-Saker hybrid falcons (Falco rusticolus x Falco cherrug), 87 Gyr-Peregrine hybrid falcons (Falco rusticolus x Falco peregrinus), (Falco rusticolus x Falco cherrug), 6 Gyr falcons (Falco rusticolus) and 2 Peregrine falcons (Falco peregrinus) were routinely checked without evidence or indications for diseases. These pre-purchase examinations included general physical examination, parasitological examination of crop and fecal samples, complete blood hematology and biochemistry profiles and endoscopy. Out of the 220 falcons tested, only 56 falcons were diagnosed negative in all categories. Alarmingly, the endoscopic examination revealed in 44 falcons the presence of Aspergillosis, one of the most dangerous diseases in falcons. 23 other falcons suffered from airsacculitis, serratospiculum or candida infections in lungs and airsacs. With regard to the fact that newly bought falcons are often kept together with other falcons, a complete pre-purchase examination should be mandatory to ensure not only the health of the new falcon, but also to prevent disease transmission to other falcons in the collection.

Keywords

Falcons, pre-purchase examination, health, prevention

1. Introduction

An “examination for soundness” or basic examination is obligatory in companion birds, especially expensive psittacines. Hereby the fecal is examined parasitologically and microbiologically as well as serologically. Moreover, the blood biochemistry, Chlamydia test and if needed X-Rays should be taken (Wedel,1999). Furthermore, a “new bird examination’ for breeding birds in the quarantine facility including physical examination, gram stain of the feces, blood smear, X- Ray and Chlamydia tests (Clubb, S.L. and K. Flammer, 1994) as well as haematology and biochemistry profiles and fecal examination has been advised (Forbes, 1994).

In cats and racing pigeons, and canine, data about parents and pedigree are not only available but also requested by the potential new owners. However, they are yet uncommon in parrots or other birds. Therefore a general physical examination and, if necessary, additional testing prior to any conclusion of a purchase deal should be performed for all birds by an avian veterinarian. This procedure should include the

examination of the feces, swabs, blood and X-Ray as well as an endoscopic examination (Hooimeiyer, 2001)
Every year, a large number of captive-bred first-year falcons, especially hybrid falcons are sold in the United Arab Emirates for falconry purposes. Nevertheless, the feature of a pre-purchase examinations has not been executed in those sensitive birds and has been virtually unknown in falcons before 2003. Usually after-sales examinations have been performed with partly disappointing results for the buyer of any sick falcon. In the hunting season 2003, the Abu Dhabi Falcon Hospital introduced for the first time ever the service of a complete pre-purchase check-up in order to evaluate the health status of those falcons. In cases of health problems, the falcons were returned to their breeder without payment of the purchase fee. The purpose of this important service is not only to detect diseases in newly arrived falcons in the United Arab Emirates, but also to maintain the health status of the already existing falcon population of the owners.

2. Material and Methods

Material

Between the time span of 11.08.2003 to 25.01.2004, the total number of 220 pre-purchase examinations in first year captive-bred falcons were performed. Out of those 220 falcons, 87 Gyr-Peregrine hybrid falcons (*Falco rusticolus x Falco peregrinus*), 125 Gyr-Saker hybrid falcons (*Falco rusticolus x Falco cherrug*), 6 Gyr falcons (*Falco rusticolus*) and 2 Peregrine falcons (*Falco peregrinus*) were routinely checked without evidence or indications for diseases.

Methods

Physical examination

The physical condition of all 220 falcons had been examined as follows:

- Weight
- Head, beak, eyes, nostrils, ears for any abnormalities, discharge
- Feathers and skin for e.g. ectoparasites, broken feathers, skin abrasions
- Feet and talons for abnormalities e.g. bumblefoot, swelling, lesion, pox lesions, overgrown talons
- Condition of pectoralis muscle
- Grade of dehydration by skin fold on the legs
- Mouth, choana and crop entrance for lesions
- Injuries

Respiratory rate

The respiratory rate is a measurement tool to assess the frequency, type and possible abnormalities of respiration before and after stress. The hooded falcons are allowed to rest for 10-15 minutes and then the respiratory frequency per minute is counted. Then the falcon is stressed for maximum one minute by flying. After this exercise the falcon rests for 2 minutes before the respiratory frequency is recounted. If the falcon returns to the respiratory frequency before stress, it will be regarded as normal breathing frequency. However, if an increase in the respiratory frequency is detected, the falcon might suffer from respiratory problems or underlying diseases.

Parasitology

The crop samples had been taken with a sterile swab (Cultiplast) soaked in sterile saline solution. The parasitological examination of 220 crop samples had been done

immediately after sample taking by direct smear and dilution of the sample in KoH solution. The examination of the 220 fecal samples was performed by direct smear and flotation method.

Blood samples

1 ml blood had been taken from the right or left basilic vein (*Vena cutanea ulnaris superficialis*) or the right or left caudal tibial vein (*Vena metatarsalis plantaris superficialis*). For hematology, 0.5ml blood was collected in a 1.0 ml EDTA tube (Teklab) and 0.5 ml blood was stored in a 2.5 ml Li-Heparin tube (Teklab) for blood biochemistry.

For 210 falcons the complete blood count (CBC) was performed directly after blood taking with a maximum delay time of 30 minutes. The following parameters have been measured: RBC, Hb, Hct, WBC, count of heterophils, lymphocytes, monocytes, eosinophils and basophils following the standard laboratory procedures (Samour et al, 1996).

The blood samples of 205 falcons were examined for biochemistry in the Schiaparelli ACE Wassermann biochemistry analyzer which is especially modified and calibrated for falcon blood. The following parameters were routinely performed: GGT, AST, ALT, TP, ALB, CK, ALT, LDH, CHOL, UA, UREA, GLUC.

Endoscopy

The endoscopic examination of 220 falcons was performed to visualize the internal organs and to assess them. Following an isofluorane anesthesia (Isolfo®, Abbott) with inhalation mask, the anaesthetized falcon was placed in lateral recumbency. The endoscope, a 2,7 mm rigid endoscope (Wolff, Germany) with the attached camera (OTV-55 Olympus) was placed between the last two ribs of the caudal thoracical air sac of the left and right side. The results of the endoscope examination were displayed on the adjunct monitor. In a few cases the endoscopic examination was verified by a biopsy sample for the cytological examination taken by a rigid biopsy forceps (Wolff, Germany). In some cases tracheal endoscopy being not a part of the study had been performed.

X-Ray

X-Rays have been taken in those cases as a supplementary diagnostic tool where further investigation was required to assess conditions like hepatomegaly, foreign bodies, lead bullets and skeletal problems.

In some cases other advanced laboratory testing for the detection of Chlamydia, Newcastle Disease Virus, Avian Influenza and microbiology like fecal, crop and airsac cultures were performed, but this has not been included in this study.

3. Results

The general physical examination detected severe dehydration over 10% in 10 cases, one falcon with white lesions in the mouth and one with keel injury.

Parasitology

Fecal

The parasitological fecal examination revealed 162 healthy falcons and 40 falcons suffering from *Caryospora* burden. 11 falcons were infected with tapeworms and 5

with Serratospiculum sp. One falcon was diagnosed with inflammatory cells in the feces.

Table 1: Fecal examination results of all falcons

Result	n=220	%
Negative	162	73.6
Caryospora	40	18.2
Tapeworm	11	5.0
Serratospiculum	5	2.3
Inflam.Cells	1	0.5
Not done	1	0.5

Table 2: Fecal examination results of Gyr-Saker hybrid falcon

Result	n=125	%
Negative	91	72.80
Caryospora	24	19.20
Tapeworm	9	7.20
Not done	1	0.80

Table 3: Fecal examination results of Gyr-Peregrine hybrid falcon

Result	n=87	%
Negative	67	77.0
Caryospora	15	17.2
Tapeworm	2	2.3
Serratospiculum	2	2.3
Inflam. Cells	1	1.1

Among the Peregrine and Gyr falcons, one Peregrine and three Gyr falcons were negative. One Peregrine falcon and two Gyr falcons suffered from Serratospiculosis.

Crop

In the crop examination, 195 falcons were negative. 12 falcons suffered from a Candida sp. infection and 7 were diagnosed with the occurrence of inflammatory cells. 3 falcons had a *Trichomonas* infection and 2 falcons a *Serratospiculum sp*. infection.

Table 4. Crop examination results of all falcons

Result	n=220	%
Negative	195	88.6
Candida	12	5.0
Inflam.Cells	7	3.2
Trichomonas	3	1.4
Serratospiculum	2	0.9
Bacteria	1	0.5

Table 5. Crop examination results of Gyr-Saker hybrid falcon

Result	n=125	%
Negative	112	89.6
Candida	6	4.8
Inflam.Cells	3	2.4
Trichomonas	3	2.4
Bacteria	1	0.8

Table 6. Crop examination results of Gyr-Peregrine hybrid falcon

Result	n=87	%
Negative	79	90.8
Candida	5	5.8
Inflam.Cells	3	3.4

4 Gyr falcons were negative and *Serratospiculum* eggs were found in one Peregrine and one Gyr. One Gyr falcon was diagnosed with inflammatory cells in the crop.

Blood hematology

The blood hematology examination of 210 falcons showed that 174 falcons had not any changes in the hematology picture. In 28 falcons, the WBC was elevated and 4 birds were diagnosed with an increased Hb and PCV. 3 falcons suffered from anemia, and 2 from Hemoproteus sp infection. 2 other falcons were diagnosed with heterophilia. Only one falcon showed a massive increased of all hematological parameters due to aspergillosis. In the following tables, more than one diagnosis was possible and therefore the number of falcons and percentage might exceed 100.

Table 7: Hematological results of all falcons

Result	n=210	%
NAD	170	81.0
WBC high	28	13.3
Hb, PCV high	4	1.9
Heterophils	2	1.0
Anaemia	3	1.4
Hemoproteus	2	1.0
All high	1	0.5
Not done	10	4.8

Table 8: Hematological results of Gyr-Saker hybrid falcon

Result	n=117	%
NAD	96	82.1
WBC high	18	15.4
Hb, PCV high	2	1.7
Anaemia	2	1.7
Heterophilia	2	1.7
All high	1	0.8
Not done	8	6.8

Table 9: Hematological results of Gyr-Peregrine hybrid falcon

Result	n=85	%
NAD	73	85.9
WBC high	8	9.4
Hb, PCV high	2	2.4
Hemoproteus	2	2.4
Anemia	1	1.2
Not done	2	2.4

One Peregrine falcon and 4 Gyr falcons did not show changes in the hematological picture. Nevertheless, the other Peregrine and two Gyr falcons had an increased WBC.

Blood biochemistry

For the interpretation of the blood biochemistry results of 205 examined falcons, the decision was taken to evaluate the results in separate parameter groups like increase of LDH, CK, urea and liver parameters. The blood biochemistry examination led to 127 healthy falcons. In 69 cases, the LDH was elevated and in 43 cases, the CK was increased. 30 falcons showed an increase of urea levels mainly due to dehydration. An increase in the one or more of the liver parameters (GGT, AST, ALT) was observed in 14 falcons. Only 3 falcons showed a massive increase of all biochemical parameters. In the following tables, more than one diagnosis was possible and therefore the number of falcons and percentage exceeds 100.

Table 10: Blood biochemistry results of all falcons

Result	n=205	%
NAD	127	62.0
LDH high	69	33.7
CK High	43	21.0
Urea high	30	14.6
Liver high	18	8.8
Mild Increase	14	6.8
Not done	9	4.4
All high	3	1.5

Table 11: Blood biochemistry results of Gyr-Saker hybrid falcon

Result	n=118	%
NAD	56	47.5
LDH high	36	30.5
CK High	25	21.2
Urea high	18	15.3
Liver high	12	10.2
Mild Increase	11	9.3
Not done	7	5.9
All high	1	0.8

Table 12: Blood biochemistry results of Gyr-Peregrine hybrid falcon

Result	n=85	%
NAD	47	55.3
LDH high	29	34.1
CK High	17	20.0
Urea high	10	11.8
Liver high	6	7.1
Mild Increase	3	3.5
All high	2	2.4
Not done	2	2.4

No changes in the blood biochemical values were observed in one Peregrine falcon and three Gyr falcons. An elevated level of LDH was found in the other Peregrine falcon and two more Gyr falcons. One more Gyr falcon had a high CK value.

Endoscopic examination

The endoscopic examination revealed 147 healthy falcons. 44 falcons were diagnosed with aspergillosis among them 28 Gyr-Saker hybrids, 15 Gyr-Peregrine hybrids and one Gyr falcon. 11 falcons suffered from airsacculitis. In 19 cases large fat deposits were detected by the endoscopy. 7 falcons had a *Serratospiculum sp*. infection and 6 were diagnosed with hepatomegaly. The examination of 3 falcons revealed one bacterial airsacculitis and two cases of airsacculitis caused by *Candida sp*. Only one falcon was diagnosed with enlarged kidneys. In the following tables, more than one diagnosis was possible and therefore the number of falcons and percentage exceeds 100.

Table 13: Endoscopic results of all falcons

Result	n=220	%
NAD	137	62.3
Lot of fat	19	8.6
Aspergillosis	44	20.0
Serratospiculum	7	3.2
Airsacculitis	11	5.0
Bacteria	3	1.4
Candida	2	0.9
Hepatomegaly	6	2.7
Kidney enlarged	1	0.5

Table 14: Endoscopic results of Gyr-Saker hybrid falcon

Result	n=125	%
NAD	88	70.4
Aspergillosis	28	22.4
Lot of fat	14	11.2
Airsacculitis	5	4
Candida	2	1.6
Bacteria	2	1.6
Hepatomegaly	2	1.6

Table 15: Endoscopic results of Gyr-Peregrine hybrid falcon

Result	n=85	%
NAD	57	67.1
Aspergillosis	15	17.6
Airsacculitis	5	5.9
Lot of fat	5	5.9
Hepatomegaly	4	4.7
Serratospiculum	3	3.4
Candida	2	2.3
Bacteria	1	1.1
Kidney enlarged	1	1.2
Not done	2	2.3

No special endoscopic findings were observed in one Peregrine and one Gyr falcon. *Serratospiculum* eggs and worms were found in the other Peregrine falcon and three Gyr falcons. One Gyr falcon suffered from aspergillosis and another one from airsacculitis.

Of all falcons, 25.9 % were without abnormal clinical findings and 74.1% were diagnosed as suffering from one or more problems. Out of 125 examined Gyr-Saker hybrid falcons, only 34 falcons (= 27.2%) were tested negative in all categories. Among the 87 Gyr-Peregrine hybrid falcons, 22 (= 25.6%) were completely healthy according to the test results and 64 (=74.4%) were tested positive in one of the categories. A similar picture can be seen among the Gyr-Saker falcons with 34 (=27.2%) falcons without clinical changes and 91 (=72.8%) falcons who showed clinical significances. Among the Peregrine and Gyr falcons, only one Gyr falcon was perfectly healthy.

4. Discussion

The falcons tested in this study originate from different countries and different breeders. Several of them entered the United Arab Emirates only up to one week prior to the pre-purchase examination. Nevertheless, for a random sampling of all incoming first year captive-bred falcons the results are not satisfying regarding the health status of these birds. So far, there are no comparative studies available. The parasitological findings of the fecal examination are not very severe as they can be treated easily. If undetected, they may arise to heavy parasite burden and subsequently develop enteritis thus reducing the training performance of the falcon. The results of the crop examination lead to the conclusion that a routine crop examination is advisable even if the falcon does not show symptoms yet. Candidiasis, trichomoniasis or inflammatory cells in the crop can lead to severe health problems in the medium to long run. Regarding the different species, major differences can not be observed among them. Nevertheless it is interesting to note that no Gyr-Saker falcon suffered from Serratospiculosis.

The hematological examination reveals in 15 falcons a correlation between high WBC parameters and the endoscopic diagnosis aspergillosis. The species-related results

show that less Gyr-Peregrine hybrids have been diagnosed with changed values in general and especially also in the WBC being an important indicator for inflammations, infections and aspergillosis. But on the other hand this species was the only one with *Hemoproteus* positive blood smear.

Most of the falcons in this study have been bred in Europe, USA and Canada. The increase in the blood biochemistry can definitely be related to the massive stress of those falcons due to transportation, long travel time, dehydration, new environment, different handling and feeding. Nevertheless, several falcons showed such a massive increase which can not be excused by those circumstances, but directly point to severe health problems. Regarding the species, it seems that Gyr-Peregrine hybrid falcons are more able to cope with these stress situations than the other tested species.

In the endoscopic examination, 29 falcons had been diagnosed with aspergillosis, but no increase of the WBC was observed. Therefore the elevated WBC levels is indicative for aspergillosis or another infection, but an Aspergillus infection might be starting or even be manifest already without visible changes of the hematology. Therefore for the detection of aspergillosis, the endoscopy is still the ultimate diagnostic tool of choice. Interestingly, Gyr-Peregrine falcons have a much reduced incidence of aspergillosis than Gyr-Saker hybrids.
The endoscopic examination resulted in only 75.5% healthy falcons. This includes 19 falcons with large fat deposits or lesions being not pathogenic. In the Middle-East, it is a common practice among traders to feed sheep meat to falcons to increase their weight in a short time. This leads to large fat deposits in the airsacs which can be observed during endoscopy. Nevertheless these fat lesions might be easily mistaken with Aspergillus, Serratospiculum or bacterial lesions and might lead to irritations or wrong diagnoses especially by inexperienced avian veterinarians. The Gyr falcons are the species most easily affected by changes in the lungs and airsacs with one healthy Gyr falcon with normal endoscopy findings.

5. Conclusion

Although this study covers exclusively first year captive-bred falcons which were around 6 months old at the time of the pre-purchase examination, the results are alarming. Only 25.9% of all falcons were perfectly healthy. The statistical percentage reveals that in the total percentage a big difference between Gyr-Saker and Gyr-Peregrine hybrid falcons could not be found. Interestingly, Gyr-Peregrine hybrid falcons were diagnosed with less pathological changes with regard to blood hematology and biochemistry as well as endoscopy. These overall results justify and encourage the examination of falcons before purchase. The pre-purchase examination does not only ensure the purchase of healthy falcons for the new owners, but also reduces the risk of sick falcons joining a healthy flock of falcons in large falcon collections. Therefore it is a highly important disease prevention feature which should not be only limited to falcons, but extended to other animal species, too. An extension of the examination for viral diseases, Chlamydia and Mycoplasma can be routinely undertaken. These results of first year captive falcons lead to questions regarding the health status of older falcons available for purchase or moving to new collections where a higher number of undetected diseases might be possible.

References

Books

Clubb, S.L. and K. Flammer. The avian flock. In: Ritchie, Harrison and Harrison Pp. 46-62

Forbes, N.A. Examination, basic investigation and handling. In: Beynon, P.H., N.A. Forbes and N.H. Harcourt-Brown 9eds.). Manual of raptors, pigeons and waterfowl. BSAVA, Gloustershire, 1996. Pp. 17-29

Wedel, A. Ziervoegel. Erkrankungen.Haltung. Fuetterung. Parey Buchverlag Berlin, 1999. Pp:42-43

Samour J.H., Bailey T.A., Howlett J.C., Naldo J. and M-A. D'Aloia: Handbook of bustard haematology. National Avian Research Center. 1996

Proceedings

Hooimeiyer, J. The purchase of birds – How to prevent problems. In; Proceedings of the 6. European AAV – DVG Conference, Munich, Germany march 7-10, 2001. Pp: 112-118

Author's contact:

Dr. Margit Gabriele Muller MRCVS, Abu Dhabi Falcon Hospital/Environmental Research and Wildlife Development Agency (ERWDA), P.O.Box 45553, Abu Dhabi, United Arab Emirates.
Tel:++971-2-5755155 / Fax:++971-2-5755001; Email: mmuller@erwda.gov.ae