

SURGICAL SEXING

Surgical sexing is an elective procedure. Only birds that are clinically healthy should be examined in this manner. It is an important tool in aviculture for determining a bird's sex and estimating age and sexual activity. In addition, the gonads can be examined for any abnormalities that might affect breeding and surrounding organs can be visually observed for any evidence of disease.

Pet birds can be endoscopically examined as well. However in such cases most clients are only interested in gender determination. They will be made aware of the risks of surgical sexing and that other non-invasive techniques are available.

PRE-SURGICAL CONSIDERATIONS

Isoflurane anesthesia is required for this procedure.

Age...if a juvenile bird is fully feathered (although not yet weaned) it can be accurately and safely sexed. Adults of any age can be sexed.

All birds are fasted (food and water) for a minimum of 4 hours beforehand. This prevents accidental passive regurgitation of crop contents into the mouth which could cause aspiration. It also helps prevent accidental puncture of an enlarged proventriculus.

Facilities, table setup, instrumentation, and sterilization procedures have all been discussed elsewhere.

POSITIONING OF THE PATIENT

Proper positioning of the patient is extremely important to ensure that the anatomical arrangement of internal organs remains constant from bird to bird. Slight alteration of the body's position can increase the risk of organ contusion

or decrease adequate viewing of the gonad due to improper instrument positioning.

There are several recommended entry sites for surgical sexing, but the site I prefer is on the left flank just anterior to the left femur. For this approach the left leg is extended caudally as far as possible and secured to the table with masking tape. The right leg is pushed underneath the body in a flexed position and left unsecured. The body should be in as perfect a lateral position as possible and not tilted dorsally or ventrally. The wings are kept folded and held in place by an assistant. Palpation of the entry site will reveal an indented fossa just anterior to the proximal one-fourth of the femur. This site is actually between the last two ribs.

The left side of the bird is always entered because female birds only have one ovary, always on the left side. Male birds have two testes, one on each side.

APPLIED ANATOMY

In the male bird, the paired testes are located within the abdominal cavity, situated on either side of the midline against the dorsal body wall, and are adjacent to the cranial pole of the left and right kidney. The paired adrenal glands are just anterior and slightly dorsal to the testes. These highly vascular structures are yellow-orange in color. The cranial pole of the kidney is reddish-brown with a smooth rounded surface and is normally larger than either the adrenal gland or gonad. In the female, the ovary's position is similar to that of the left testis. In the adult female, the ovary may completely or partially cover the left adrenal gland. The gonad, adrenal gland, and cranial pole of the kidney form a triad that the operator should always identify when surgically sexing birds.

The gonads and adrenals are situated within the intestinal peritoneal (coelomic) cavity that runs along the midline from the cranial pole of the kidney to the cloaca. The kidneys lie retroperitoneal to this cavity: the abdominal air sacs

occur lateroventrally. When entering the abdominal cavity from the left flank approach, the abdominal air sac cavity is entered first, its medial membrane penetrated, and the intestinal peritoneal cavity then entered.

SURGICAL PROCEDURE AND TECHNIQUE

After properly disinfecting the skin, a scalpel blade is used to make a 2-3 mm incision. Care is taken not to incise the underlying muscle, which bleeds profusely if cut. If hemorrhage occurs, direct pressure is applied before continuing.

Next the trocar-cannula device is used to puncture a hole through the abdominal wall. Insertion of this device is accomplished totally by feel. It is an art and skill that can only be learned by practice and experience.

The trocar-cannula is held perpendicular to the bird's body and angled slightly dorsally and cranially. The distal end of the device is held firmly with the thumb and index finger of one hand while the palm of the other pushes the instrument from the top with controlled, rotating pressure. On penetration, a definite decrease in resistance will be felt, and sometimes a characteristic pop will be heard. An attempt is made to extend the trocar-cannula gently downward and also penetrate the abdominal air sac membrane. With practice, this penetration can be felt by the operator. The trocar is then removed from the cannula and the endoscope is inserted.

The cannula is not normally used on birds weighing less than 60g. The cannula increases the diameter of the inserted instrument by at least 1 mm, which can be critical in preventing internal contusion in very small species. In these birds, the trocar alone is used to penetrate the muscle and then the endoscope is introduced through the hole by itself.

On insertion of the endoscope, the exact location of the tip can be verified visually. If the endoscope is still in the abdominal air sac, the operator can gently push the lens tip against the air sac membrane to puncture it. If it will

not tear, the trocar is reintroduced through the cannula and slowly pushed forward with steady pressure, making sure beforehand that no organs are visible directly beneath the membrane in the area to be penetrated. Once through, the gonad should be easily seen.

If the abdominal air sac membrane is relatively clear, the gonad may be seen without having to penetrate it. The view is enhanced by simply pushing the endoscope tip up against the membrane. If the membrane is opaque due to inflammation, fat infiltration, hemorrhage, or glare from reflected light, then the intestinal peritoneal cavity must be entered to accurately sex the bird or examine the gonads for abnormalities.

On entering the intestinal peritoneal cavity, the endoscope is angled dorsally until the reddish-brown, smooth left kidney is identified. Moving anteriorly, the gonad and adrenal gland are identified adjacent to the kidney's cranial pole. Anterior to the triad, the pink lung is seen with its easily discernible parabronchi. Ventral to the kidney, the operator can see the proventriculus, which is large, smooth, and white in color. The much smaller round spleen is just dorsal to the proventriculus and is red or purple in color. Intestines are easily visualized and can vary greatly in color. The liver is not easily seen from this view. If the scope is directly caudally, the entire left kidney, left ureter, oviduct or left ductus deferens, and cloaca can be observed.

On completion of the examination, the endoscope is withdrawn and the skin and muscle closed together with one, 4-0 chromic gut suture. In small species, tissue glue is used to seal the entry site.

The bird is then tattooed according to gender by injecting a small amount of black pigment subcutaneously on the underside of the patagium (wing web) of the left wing if it is a female or the right side if it is a male. Approximately 0.05 ml of the pigment is injected in a bird the size of a macaw, less for smaller species. After a few days the pigment spreads out over the patagium, creating a large black blemish which will remain there for years. Only high quality human tattoo ink is used. Clients often complain that they cannot find the tattoo.

Visual identification is enhanced by wetting the patagium with alcohol to mat the feathers.

Antibiotics are not routinely administered after laparoscopy if there are no complications. Birds are recovered as previously described. Postoperative home instructions are covered in another protocol.