Endoscopy and Endosurgery in Nonhuman Primates

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INTRODUCTION

The most recent compilation by the International Union for Conservation of Nature/Species Survival Commission Primates Specialist Group recognizes 16 families, 77 genera, 479 species, and 681 taxa of nonhuman primates (NHPs).1 NHPs can be divided in prosimians, monkeys, and apes, with most being monkeys (70%). Great apes account for only 2% of all taxa, even though they are the most commonly known by the general public.1 Laparoscopy in NHPs was first described in the 1970s.2 Minimally invasive surgery has resulted in improvements in research and clinical care. As in human surgery, endoscopy will have an expanding role in the future.2–4 The endoscopic indications and procedures performed in nonhuman primates are similar to those in humans.

KEYWORDS

- Nonhuman primate • Endoscopy • Diagnosis • Minimally invasive surgery
- Salpingectomy

KEY POINTS

- Endoscopy in nonhuman primates is of great value for the diagnostic process, minimally invasive surgery, and research applications.
- Knowledge of the specific anatomy, physiology, anesthesiology, and management are mandatory before performing endoscopy in nonhuman primates.
- Valuable information may be gained from the human endoscopy literature.
- Endoscopy is a tool that often provides a definitive diagnosis.
- Endosurgery is the obvious choice for nonhuman primates because self-mutilation of surgical wounds is common.

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The approach is also similar to that used for dogs and cats, and much can be learned and applied from the domestic animal and the human literature. Limitations are related to equipment availability and surgeon training. This article presents selected endoscopic procedures that are frequently performed in NHPs, including rhinoscopy, tracheobronchoscopy, gastrointestinal endoscopy, laparoscopy, and endoscopic salpingectomy.

**Indication/Contraindication**

The most common indications and contraindications for the selected endoscopy procedures performed in NHP are listed in Table 1.

**EQUIPMENT**

Given the diversity in patient size and the variety of endoscopy procedures, different scopes and instruments may be required. Basic endoscopy equipment necessary for the performance of the selected procedures discussed here in NHP between 500 g and 250 kg consist of:

- A 2.7-mm diameter, 18-cm length, 30° angle oblique rigid telescope with a 4.8-mm operating sheath
- Endovideo camera and monitor

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Principal Indications</th>
<th>Contraindications</th>
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<tbody>
<tr>
<td>Rhinoscopy</td>
<td>Sneezing; nasal discharge; epistaxis; and sampling tissues for cytology, histology, and culture</td>
<td>Clotting disorders</td>
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<td></td>
<td>Minimally invasive surgery (see Fig. 2)</td>
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<tr>
<td>Tracheobronchoscopy</td>
<td>Acute or chronic cough that is unanticipated or unresponsive to standard medical therapy, unexplained radiographic infiltrates, tissue sampling, bronchoalveolar lavage</td>
<td>The procedure should not be performed in patients that are not candidates for general anesthesia and unless oxygenation can be maintained</td>
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<tr>
<td>Gastrointestinal endoscopy (esophagus, stomach, duodenum, and large intestine)</td>
<td>Weight loss, vomiting, diarrhea, intestinal bleeding, unexplained anemia, anorexia, sialorrhea, melena, foreign body removal</td>
<td>Complete intestinal obstruction; in that case, traditional laparotomy is preferred</td>
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<tr>
<td>Laparoscopy</td>
<td>Abnormal results from laboratory work or abnormalities diagnosed on imaging (abdominal radiographs and ultrasonography)</td>
<td>The main contraindications are obesity and pregnancy</td>
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<tr>
<td>Endoscopic salpingectomy</td>
<td>Elective sterilization</td>
<td>Pregnancy, large reproductive mass</td>
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</tbody>
</table>

Table 1

Most common indications and contraindications for the selected endoscopy procedures performed in nonhuman primates