The development and preclinical evaluation of devices intended for the endovascular treatment of aneurysms require a variety of models. Since its description by German and Black in 1954, the canine vein pouch model has been widely used in such efforts. There is, however, little information regarding its natural history (incidence of spontaneous thrombosis or rupture). With this in mind, we retrospectively evaluated our experience with the model over a 6-year period.

Materials and Methods

A retrospective review of laboratory records of canine vein pouch aneurysms made during a 6-year period was performed. The aneurysm and parent artery dimensions as well as incidences of spontaneous thrombosis and rupture were noted.

RESULTS: During the interval studied, 326 vein patch aneurysms were made in 310 canines. Of these, 102 were sidewall (lateral) and 224 were bifurcation aneurysms. Spontaneous occlusion occurred in 9 of the sidewall aneurysms and in only 1 of the bifurcation aneurysms. None of the aneurysms ruptured.

CONCLUSION: Spontaneous occlusion of the sidewall canine vein patch aneurysm occurred less than 10% of the time; in the bifurcation aneurysms, it almost never occurred. These characteristics enhance the value of this model for use in testing of devices intended for the endovascular treatment of aneurysms.
ameter of the common carotid artery proximal to the aneurysm was 3.7 mm; the average diameter of the continuation of the right common carotid artery distal to the aneurysm was 3.3 mm and that of the left common carotid artery distal to the aneurysm was 3.4 mm. Of the 153 aneurysms for which measurement of aneurysm size was recorded, the average aneurysm dimensions were 10.3 mm in height, 7.7 mm in diameter, and 5.5 mm in the ostium. There was no record of spontaneous rupture of any of the bifurcation aneurysms.

Discussion
This retrospective review of a 7-year experience shows that there is almost never spontaneous thrombosis of the canine bifurcation aneurysm. Spontaneous occlusion of sidewall aneurysms occurred in only 9%, and partial thrombosis, in 5% of our animals. Because of this small incidence of spontaneous occlusion, as well as the need to complete wound healing occur before implant of a test device in studies looking at histologic response to implants, several weeks' healing time was allowed between aneurysm creation and use of the animal for device testing. The difference in the incidence of spontaneous occlusion of sidewall versus bifurcation aneurysms is likely primarily related to differences in the hemodynamics, with an important factor causing these differences being the smaller ostium (4.7 mm versus 5.5 mm) and the smaller dome size (10 × 8 mm versus 7 × 6 mm) of lateral aneurysms compared with the bifurcation aneurysms.

These findings regarding the sidewall aneurysms are in agreement with those of an earlier report from our laboratory and with that of Kallmes et al., who studied the natural history of canine sidewall aneurysms in a small series (8 animals, each with 2 aneurysms). The authors of another recent report found improved patency rates by adjusting their technique to create an oblique angle of the vein graft at the ostium. This, however, does change the hemodynamic pattern of the lateral aneurysm. Although patency rates will likely vary between centers and between operators, we have always used a 4.4-mm vascular punch in an attempt to standardize the aneurysm ostium.

To our knowledge, except for the recent description by Yong et al. of 3 canine bifurcation aneurysms, there is no prior study regarding the natural history of the canine bifurcation aneurysm. We have found that the patency rate is very high and the aneurysms do not rupture spontaneously. Although having an aneurysm model that has a significant incidence of spontaneous ruptures would be desirable, a model that reliably remains patent and does not spontaneously rupture is still quite useful.

Because of its lack of spontaneous thrombosis or rupture, the large vessel and aneurysm size, the ease of performing multiple high-quality angiographic evaluations, and the ease of animal care and handling, the canine vein pouch aneurysm model is valuable for the preclinical study of devices intended for the endovascular treatment of aneurysms. Its widespread use and the significant literature regarding the biologic response of a variety of devices used in this model further enhance its usefulness.

Conclusions
Spontaneous occlusion of the sidewall canine vein patch aneurysm occurred less than 10% of the time; in the bifurcation aneurysms, it almost never occurred. These characteristics enhance the value of this model for use in testing of devices intended for the endovascular treatment of aneurysms.

References