

A simple procedure to secure an indwelling jugular vein catheter to the neck of cattle for repeated blood sampling

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Abstract — A procedure to secure a jugular vein catheter system to the neck of cattle is described. A wide-mouthed polypropylene bottle attached to a halter strap provided a secure container for the catheter. This device allowed convenient access to the catheter for repeated sampling and, apparently, reduced discomfort to the cattle.

Résumé — Procédure simple pour fixer à demeure une sonde dans la veine jugulaire des bovins, afin de procéder à des prélèvements sanguins fréquents. Une procédure pour fixer une sonde dans la veine jugulaire des bovins est décrite. Une bouteille en polypropylène à large goulot attachée au licou constitue un contenant sécuritaire pour loger la sonde. Ce dispositif donne facilement accès à la sonde et permet d'effectuer de fréquents prélèvements avec, apparemment, une réduction de l'inconfort.

(Traduit par Docteur André Blouin)

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Catheterization of the jugular vein is a common technique used in research for repeated blood sampling in cattle. Although the insertion of the catheter into the jugular vein is fairly simple, maintaining a patent catheter for an extended period of time often poses a problem because of animal movement and repeated handling of the catheter. This is especially true for research trials in reproductive physiology involving heifers or cows during estrus, when they tend to be excited and hyperactive.

A common procedure for securing the catheter tubing in place uses an elastic-type wrap around the neck of the animal. Even though this wrap remains functional for a short period of time, it is our experience that it becomes loose with increased frequency of handling during repeated blood sampling. The elastic-type wrap does not hold the catheter securely and catheters are often pulled out, kinked, or otherwise damaged. In addition, animal movement while sampling increases direct contact and irritation to the skin, which appears to annoy the cattle. Ettlenger et al (1) reported that mechanical irritation caused by the catheter during frequent blood sampling could result in thrombophlebitis; this contradicts the goal of indwelling jugular vein catheterization, which is to minimize discomfort to cattle during repeated

sampling. In the present report, we describe a simple device that allows for easy access to a catheter for repeated blood sampling from the jugular vein and minimizes discomfort to cattle.

Holstein heifers ($n = 25$) were catheterized with indwelling jugular catheters for the purpose of collecting blood samples at 1- or 2-hour intervals over a 48-hour period. Animals were housed and cared for in accordance with CCAC guidelines (4), and all experimental procedures were approved by the Animal Care Committee of the University of Alberta. The catheterization procedure followed aseptic techniques (2,3) using polyethylene intramedic catheter tubing (I.D. 1.67 mm; Becton Dickinson, Oakville, Ontario) and a 12-gauge stainless steel hypodermic needle. Sterilization was achieved by passing 70% alcohol through the catheters by using a syringe; catheters were then left immersed in alcohol overnight. A 15-cm piece of duct tape was wrapped around the catheter, close to the insertion site, leaving flaps that were sutured through the skin to hold the catheter in place. The free end of the catheter was fitted with a hypodermic needle hub and a 3-way valve to control blood flow and allow the catheter to be filled with heparinized saline to prevent blood clotting.

Each heifer was fitted with a catheter, which was secured by either an elastic type wrap (Co-Flex; Andover Coated Products, Salisbury, Massachusetts, USA) ($n = 6$) or a square polypropylene bottle (Nalgene no. 2110-0032, capacity 1000 mL; Nalgene, Rochester, New York, USA) attached to a bovine halter ($n = 19$). Since the bottles were too tall (approximately 18 cm) for hand access to the catheter through the 6-cm diameter screw top lid, they were cut in half, fitted one inside the other,

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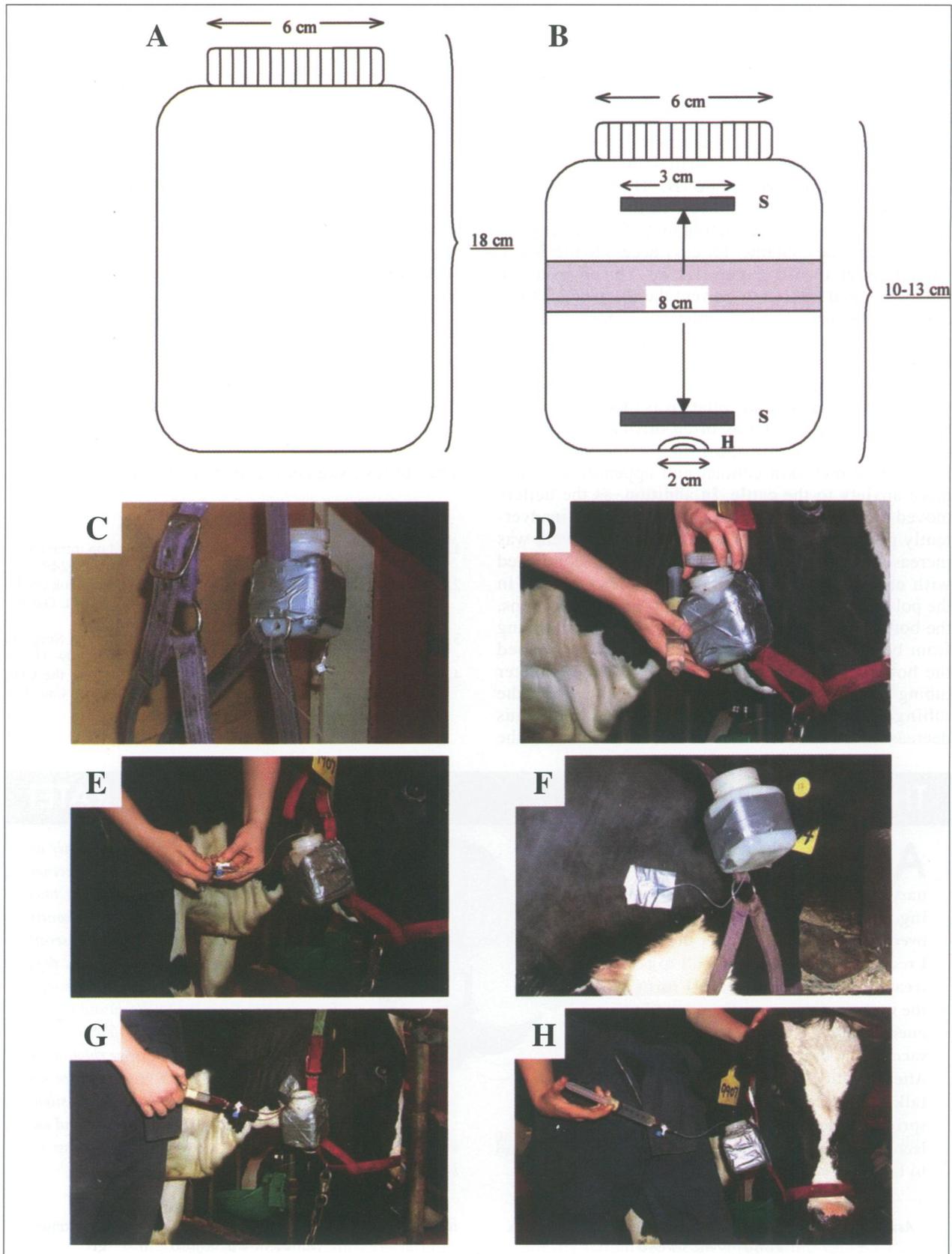


Figure 1. A — original square polypropylene bottle before modification; B — modified square polypropylene bottle showing slits for threading the halter strap (S) and hole (H) for catheter access; C — halter equipped with modified square polypropylene bottle and secured with duct tape. Catheter tubing shown coming from the hole with 3-way valve fitted at free end; D — demonstration of access to catheter through screw lid of bottle; E — catheter tubing lifted out of the bottle and 3-way valve shown; F — heifer shown with bottle on halter and catheter inserted into the jugular vein; G — blood sample being drawn; H — heparinized saline infusion through catheter to prevent clotting.

and secured with plastic ties for a final height of 10 to 13 cm (Figure 1A, B). Thus, catheter tubing at the bottom of the bottle could be reached easily by using fingertips. Two horizontal slits approximately 3 cm long and 8 cm apart were cut on one side of the container (Figure 1B, "S") to produce a loop for threading the poll strap of the halter through. Duct tape was used to secure the container in place on the halter. A hole, approximately 2 cm in diameter (Figure 1B, "H"), was cut in the bottom of the container, closest to the side with the slits, to allow the catheter tubing to go from the jugular vein through the container for easy access to the 3-way valve through the lid (Figure 1D, E). The edges of the hole were filed smooth to prevent the sharp edges from damaging the catheter. The catheter was loosely coiled and placed in the bottle (Figure 1F), exposing only a short length of the catheter.

Experience had shown that sampling from heifers wearing the wrap-around collars was inconvenient and time consuming, as it was often difficult to find the catheter tubing within the folds of the wrap. This increased direct skin contact and appeared to cause more anxiety to the cattle. In addition, as the heifers moved around during sampling, the chance of inadvertently pulling the catheter out of the jugular vein was increased. In contrast, blood sampling was conducted with ease (Figure 1G, H) from catheters placed in the polypropylene bottle. Based on visual observations, the bottles remained in place and protected the tubing from being damaged, even when the heifers rubbed the bottles against hard surfaces. Since the catheter tubing was coiled inside the bottle, the site where the tubing entered the vein was never disturbed, thus decreasing the chance of irritation. Furthermore, as the

bottles were secured to a halter strap, there was little direct skin contact and the heifers appeared less bothered during sampling.

The excess catheter tubing coiled in the bottle allowed the sampler to keep a greater distance from the heifer during blood sampling. The risk of pulling the catheter out and causing discomfort to the cattle was greatly reduced. While kinked, broken, or blocked catheters were common with the wrap-around collars, such problems were rarely encountered with the polypropylene bottle. However, it should be mentioned that the exposed loop (Figure 1F) of the catheter tubing in 2 of the heifers broke after apparently being snagged by a sharp metal object in the tie-stall. Necessary precautions to prevent such mishaps may include removing or covering any sharp edges and corners in the stall or pen. Alternatively, an elastic- or cloth-wrap placed lightly around the neck of the heifer to cover the exposed portion of the catheter should help to prevent accidental snagging and breakage. To avoid the labor associated with the cutting and resizing of the plastic bottles, the use of 500 mL polypropylene bottles (Nalgene) is recommended. CVJ

References

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THE FUNNY FILE

A client brought a litter of golden retriever puppies to my veterinary clinic for vaccinations and deworming. As the look-alike pups squirmed over and under one another in their box, I realized it would be difficult to tell the treated ones from the rest. I turned on the water faucet, wet my fingers, and moistened each dog's head when I had finished vaccinating it, in order to tell them apart. After the 4th puppy, I noticed my hitherto talkative client had grown silent. As I sprinkled the last pup's head, the woman leaned forward and whispered, "I didn't know they had to be baptized, too."

(Submitted by Dr. Bruce G. McLaughlin,
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Schaumburg, Illinois)

Come on ... I dare ya ... Make me laugh. Submissions to:
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ÇA DILATE LA RATE!



Une cliente m'avait emmené une portée de golden retrievers pour les faire vacciner et vermifuger. Comme les chiots étaient tous semblables et qu'ils se tortillaient les uns contre les autres dans leur boîte, j'ai pensé qu'il serait difficile de distinguer ceux que j'avais déjà vaccinés des autres. J'ai décidé de leur mettre quelques gouttes d'eau sur la tête quand j'avais fini de les vacciner, pour les différencier des chiots non traités. Après le quatrième chiot, je me suis aperçu que ma cliente, très loquace au début de la consultation, était devenue silencieuse. Je «marquais» le dernier chiot quand elle me dit tout bas : «Je ne savais pas qu'il fallait aussi les baptiser.»

(Proposé par le Dr Bruce G. McLaughlin,
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