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Preparing for an Abdominal Procedure

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Key Points

- Learn thorough preparation of an operating room for a standard abdominal exploratory procedure.
- Learn appropriate preparation of the patient, including surgical clip, scrubbing, positioning, and draping.
- Learn about setting up instrumentation for a standard abdominal procedure.

Introduction

This chapter focuses on the detailed preparation of the patient, operating room setup, instrumentation setup, and intraoperative and postoperative considerations when managing an abdominal exploratory procedure.

intravenous catheter has been placed. Once general anesthesia is induced, the patient is positioned in dorsal recumbency. Monitoring equipment may then be attached, including but not limited to electrocardiogram, pulse oximetry, noninvasive blood pressure, and a capnometer. If a patient's position needs to be adjusted at any point, it is ideal to disconnect the breathing circuit from the patient's endotracheal tube to prevent extubation or tracheal damage.

Preoperative Steps

Equipment Preparation

Immediately prior to an abdominal procedure, the operating room is set up with the appropriate equipment and instrumentation depending on the type of abdominal procedure (Box 1.1, Figure 1.1). Creating a list of commonly used instruments and surgeon's preferences for a variety of procedures may help with efficiency when setting up an operating room (Figure 1.2). Heating systems should be turned on. Intravenous fluids are spiked and primed. Anesthetic machines are checked for leaks (Figure 1.3), and an induction area is prepared (Figure 1.4) with the necessary materials (Box 1.1).

At this point, the patient has had the appropriate diagnostic imaging and the required blood work, and an

Skin Preparation

Since the duration of anesthesia correlates with infection rates, preoperative preparation should be thorough but efficient. Clipping should be performed outside of the operating room to minimize contamination. The technician should wear exam gloves while clipping. With a #40 clipper blade, shave the patient's ventrum cranial to the xiphoid (mid-thorax), caudal to the pubis, and lateral to the mammary chain (Figure 1.5). Be sure to watch the temperature of the clipper blade. If the blade becomes palpably hot, either replace the blade or spray it with a cooling lubricant. In areas with friable, thin skin, it is advised to have steady movements to reduce the risk of unwanted abrasions. After clipping is completed, a vacuum can be used to pick up loose hair.

Box 1.1 Examples of Equipment and Instrumentation Needed for an Abdominal Surgical Procedure

- Suction unit, hose, and canister
- Electrosurgical unit with equipment (e.g., monopolar cautery pen, bipolar cautery pen, foot switch, ground plate, cautery tip cleaner)
- Vessel-sealing device (e.g., LigaSure™ Atlas or Precise)
- General surgery pack (e.g., surgical gowns, large patient drape, towel drapes, bulb syringe, needle counter box, radiopaque gauze)
- Soft tissue instrument tray (e.g., towel clamps, scalpel handles, needle holders, thumb forceps, dissecting scissors, suture cutting scissors, tissue forceps, hemostatic forceps, bowl)
- Suction tip (e.g., Poole, Frazier, Yankauer)
- Retractors (e.g., Balfour, Senn, malleable)
- Stapling equipment (image within this box) (e.g., hemoclip staples, thoracoabdominal (TA) stapler with cartridge, gastrointestinal anastomosis (GIA) stapler with cartridge, skin staples)
- Laparotomy sponges
- Kick bucket
- Light handles
- Sterile gloves
- Suture
- Blades (#10, #11, and #15)



Stapling equipment cart

- Other instruments (e.g., antimicrobial incise drape, biopsy punch, hemostatic products, surgical drain, bladder cystotomy spoon, urethral catheters, sterile lube, sterile syringes, needles, stomach tube)
- Specimen collection (e.g., Formalin, culture, glass slides)

(a)



(b)



Figure 1.1 (a) Equipment and instrumentation in the operating room. (b) Instrumentation for an exploratory laparotomy laid out.

Male

The cranial and lateral shave margins will remain the same. The caudal clip should extend to the scrotal region in dogs, and if a urology procedure is being performed in cats, the caudal clip should extend dorsal to the prepuce. When shaving around the prepuce, care should be taken near the mucocutaneous junction to not nick the edges. After the clipping is complete, the prepuce should be flushed with diluted povidone-iodine using a syringe. This is done by grasping the edge of the prepuce, inserting the syringe tip, pinching the prepuce, and then injecting the povidone-iodine (Figure 1.6). While still pinching with one hand, massage the prepuce with the other hand to loosen any debris. Place an absorbent pad over the prepuce and expel the flush. This is repeated three times or until the flush is clear.

Female

In urology procedures, include the vulva in your shaving margins for intraoperative catheterization.

Splenectomy/Pyometra

- Soft pack/cautery/light handles
- (2) Poole suction tip
- Balfour
- Blue hemoclip set
- Ligasure
- ABD pads
- 4 mm biopsy punch
- Vetspon
- Extra brown tray

Position: Dorsal recumbency

Subcutaneous Ureteral Bypass (SUB Port)

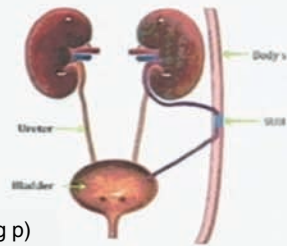
- Soft pack/cautery/light handles
- Poole suction tip
- Balfour
- Sharp senn
- Micro-Cooley needle driver
- Extra Sm towel clamps
- Malleables
- Patient drape
- C-arm drape
- Sterile skin glue
- Sub-port kit system per surgeon

Position: Dorsal recumbency

Reminder: Normal Ex-Lap shave/need C-Arm & Table

Dr. [REDACTED]

- LigaSure instrument tray
 - Soft Gauze
- Dr. [REDACTED]
- [REDACTED] Ligasure
 - Left-Handed needle drivers
- Dr. [REDACTED]
- Duraprep/loban



- ABD pads
- CTA's
- 3-Way stop-cock
- Luer lock T-Port (Ax room)
- (3) 6 cc syringe
- 22 g IV catheter (Sm p) or 18g (Lg p)
- 3-0 Monocryl
- 3-0 Prolene
- Omnipaque - **Please let O.R Tech know**
- Syringe and needle (P dependent 1ml/pound
Ex: P 10 pounds = 12 cc Syringe)

Figure 1.2 Example of a procedure instrument list.



Figure 1.3 Anesthetic machine, intravenous fluids, monitoring equipment, and heating systems ready to be used.



Figure 1.4 Induction area prepared.



Figure 1.5 Patient has been shaved. Supplies for a “dirty” scrub are laid out.



Figure 1.6 A syringe filled with diluted povidone-iodine being inserted inside the prepuce.

The technician should replace their gloves for the “dirty” scrub. Have two stacks of nonwoven gauze set aside. Keep one stack dry and the other one mildly dampened with water (Figure 1.5). Lightly pour chlorhexidine scrub onto the dampened gauze. Begin scrubbing from the center of the abdomen and continue moving outward in a spiral course until the shaved region has been covered. Avoid an aggressive scrubbing motion to reduce the risk of skin irritation and inflammation. Follow it with the dry gauze to clear excess lather. This combination is repeated a minimum of three times or until the gauze no longer contains visible debris. For long-haired patients, water or ultrasonic gel can be used to push the hair down to keep it away from the surgical field.

Transportation into the Operating Room

It is recommended to use a gurney as it is considered the safest method of patient transportation. The patient is moved onto the operating table and is placed in dorsal recumbency. The breathing circuit is once again connected to the patient, with oxygen and anesthetic gas turned back



Figure 1.7 Patient is positioned on the operating room table with additional heat support provided by warmed bags of fluids and rice.

on. If the anesthesia machine has both sevoflurane and isoflurane capabilities, be sure that the correct gas is selected. Monitoring equipment, intravenous fluids, and heat support are applied to the patient (Figure 1.7). The anesthetist can administer the prophylactic antibiotic injection around this step or 30–60 minutes before the incision is made.

Positioning

Using a V-top operating table can help keep patients in dorsal recumbency. If using a flat-top table, a V-trough or sandbags can be used to assist in patient stabilization. To keep the sternum centered and prevent shifting, the patient’s limbs should be secured with tape, ropes, or leashes. Distal limb perfusion is improved by spreading the forces applied circumferentially to the extremities. Caution should be exercised to prevent overtightening of the limb (Figure 1.8).



Figure 1.8 Patient’s limbs safely secured.

Sterile Scrub

Patient is now ready for sterile preparation. Remove the cap from the sterile saline bottle and have chlorhexidine scrub set to the side. Open a sterile bowl containing a stack of sterile nonwoven gauze. Apply a sterile glove to the dominant hand only. Split the sterile gauze into two stacks with the dominant hand, leaving one stack inside the bowl and keeping the other stack dry outside of the bowl (Figure 1.9). With the nonsterile hand, pour sterile saline into the bowl until the gauze is well dampened. Lightly pour chlorhexidine scrub onto the dampened gauze. With the dominant hand, begin scrubbing from the center of the abdomen and continue moving outward in a spiral course until the shaved region has been covered. Do not scrub toward the center of the abdomen after touching any hair on the periphery; simply throw away that gauze after contacting the hair. Each chlorhexidine swipe should last approximately 60 seconds to allow adequate contact time, before wiping off with the sterile dry gauze. This combination is repeated a minimum of three times. If hair is touched, restart the count. Ensure the abdomen is completely dry prior to the surgeon starting surgery, especially if using alcohol-based scrub.

Draping

Open the general surgery pack (Figure 1.10) and the soft tissue instrument tray (Figure 1.11). Lay out a sterile gown and gloves for the person scrubbing in (Figure 1.12). From this point, each of the following tasks should be performed with the intent of avoiding contamination. Utilize a “four-quarter-drape” technique using the sterile surgical towels on the abdomen. Stepping away from the sterile field, open and hold a surgical towel. Use both hands to fold the top of the longest side away from the sterile assistant. Position each hand on the corners and wrap the towel around them, creating a cuff.



Figure 1.9 Supplies for a sterile scrub.



Figure 1.10 General surgery pack.



Figure 1.11 A soft tissue instrument tray.



Figure 1.12 A surgical gown and gloves opened.

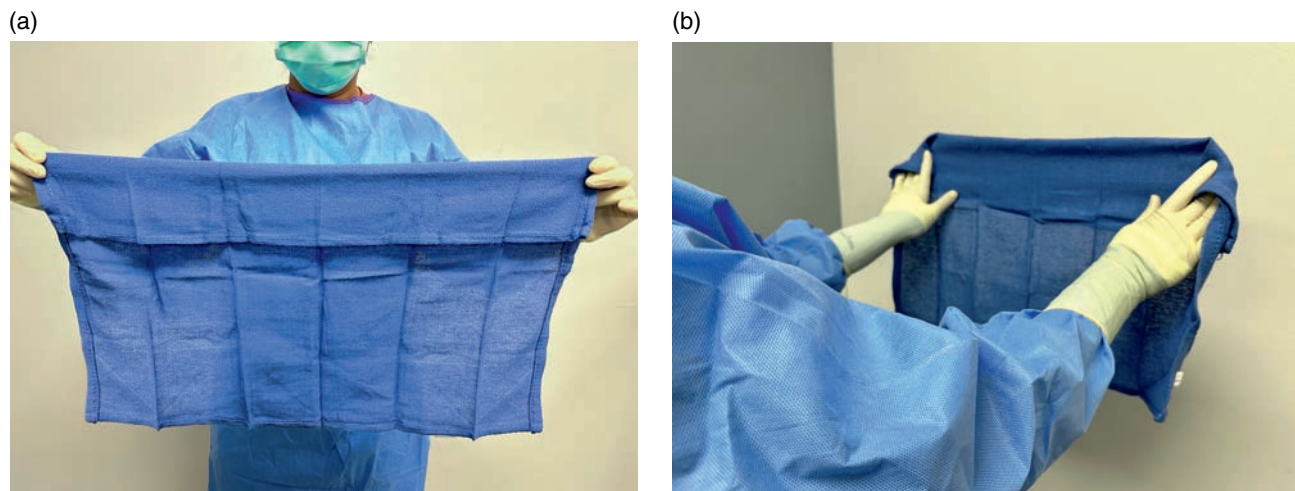


Figure 1.13 Folding of a towel drape. (a) Top of the drape is folded. (b) Drape is wrapped around each hand.

This will protect the sterile glove from contacting the patient while draping (Figure 1.13). While making sure the surgical gown does not touch the unsterile part of the table, place a towel cranially, caudally, then on the side nearest to the sterile assistant first, before placing a towel on the farthest side away from the assistant. Placement of the towels should be approximately 1-inch from the clipped hair. Sterile towels should not be dragged inward after being laid down, as this would no longer be considered sterile due to cross contamination. The corners where the towels meet should overlap each other. Next, place the towel clamps about 5 mm from the lateral aspects of the towel, penetrating both the towel and epidermis. Each towel clamp should only be tightened to the first ridge. Towels should be even and taut to prevent hair from entering the sterile field. For male patients, use a towel clamp to move the prepuce out of the surgical field away from the surgeon's side (Figure 1.14), unless the surgery involves assessing the urinary tract.



Figure 1.14 The prepuce is moved out of the surgical field using a Backhaus towel clamp.

A large patient drape sheet is then placed on top of the patient. Keeping one hand on the patient drape, start unfolding cranially and caudally, including the sterile instrument table to create one big sterile field. Open the drape toward the sterile assistant. Next, use both hands to spread open the rest of the drape while avoiding contact with the non-sterile table with the front of the sterile gown (Figure 1.15). Refrain from cutting a hole on the patient drape until instrumentation has been set up to reduce skin exposure.

Surgical Instrument Table

The patient and surgical instrument table should now be draped. Before an extra protective layer is added on top of the instrument table with a huck towel, any cord (e.g., monopolar or bipolar cautery and LigaSure) can be laid out and passed off to the circulating technician toward the back of the table to be plugged into their respective power sources. The towel drape will help the cords stay hidden and prevent them from getting in the way intraoperatively (Figure 1.16). If suction or any other connections are at the front end of the patient table, secure them with a spare traumatic forcep, like an Allis tissue forcep. Avoid using an atraumatic forcep, like a mosquito hemostatic forcep, to prevent the more delicate instruments from being damaged.

The soft tissue tray can now be placed on the instrument table with the rings of the instruments facing the surgeon. Instrumentation should be set out in the order that it will be utilized, and the dexterity of the surgeon should be considered (i.e., left- versus right-handed). A set of spare clean instruments (e.g., needle drivers, tissue forceps, and suture scissors) with new sterile gloves for the surgeon should be set to the side in “clean-contaminated” cases, such as gastrointestinal procedures, to reduce cross contamination (Figure 1.17). The circulating technician may begin

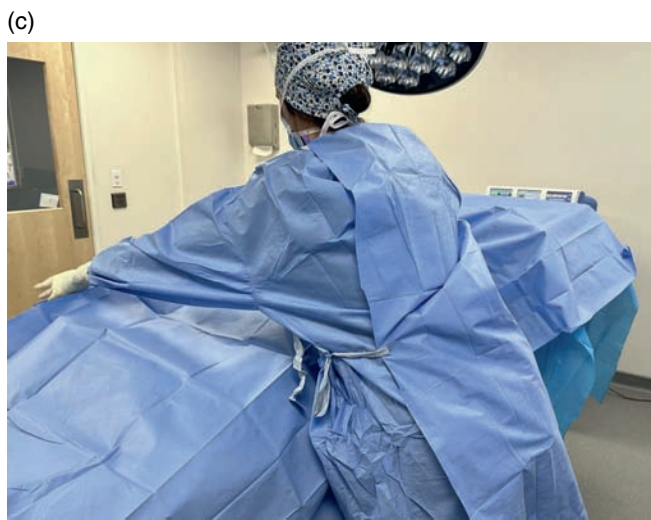
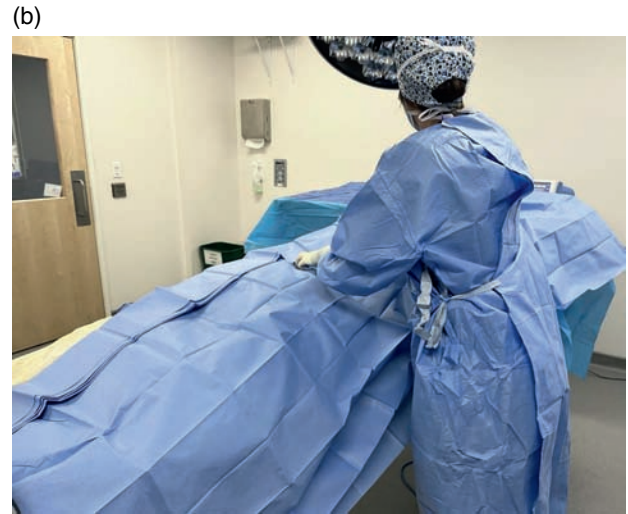


Figure 1.15 (a) A large drape is extended cranially and caudally. (b) The drape is unfolded toward the sterile assistant. (c) Both hands are used to spread open the rest of the drape. (d) One large sterile field is created.

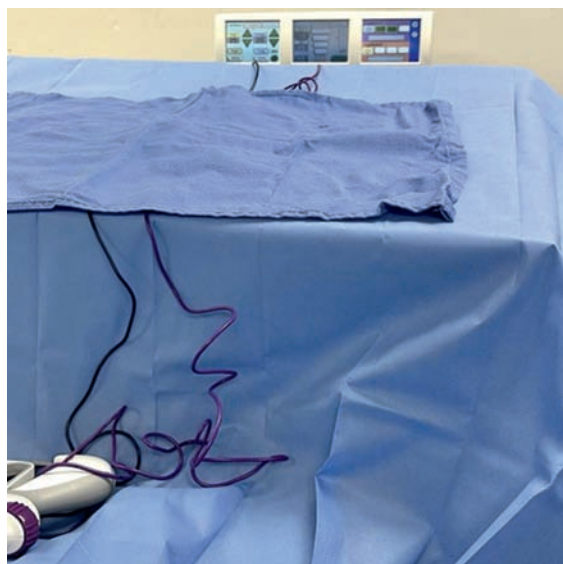


Figure 1.16 Sterile towel placed over excess cords to maintain a clean workspace.



Figure 1.17 Sterile closing instruments saved at the back of the table during a clean-contaminated procedure.



Figure 1.18 Complete instrument set-up.

opening more instruments (e.g., Balfour retractor, abdominal pads, and light handles). A sponge count should be completed, and scalpel blades are to be dropped last (Figure 1.18). Create a hole in the patient drape in a rectangular shape to expose the abdomen. Additional towel clamps on top of the patient drape may be used for extra security to prevent it from sliding and should ideally be non-penetrating through the patient drape (e.g., Lorna towel clamps) (Figure 1.19). The surgeon may want to place an incise drape (e.g., 3M™ Ioban™) over the abdomen. Ioban is an antimicrobial incise drape that adheres

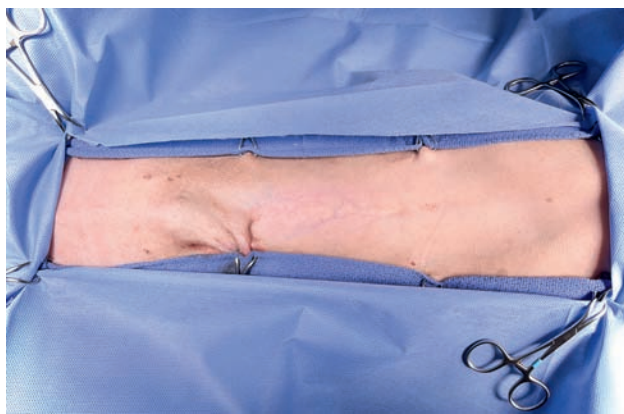


Figure 1.19 Towel clamps securing patient drape over the previously placed towel clamps for the quarter-draping. While the clamps pictured are Backhaus, the most appropriate clamps for securing the patient drape are nonpenetrating clamps, such as Lorna.

securely to the skin, designed to reduce the risk of surgical site infection. Another advantage of using an adhesive incise drape is that it allows the patient to stay warm and dry during lavaging of the abdomen.

This completes the instrument table and patient setup.

Intraoperative Considerations

Checklist

Before the surgeon starts the incision, people in the operating room should introduce themselves and a technician will recite a safety checklist. A checklist helps ensure that important information has been gathered and reduces the potential for medical errors, thus, improving patient care (Figure 1.20).

The operating table should be adjusted to the surgeon's height to ensure good posture (Figure 1.21). The technician circulating should pay attention to the procedure and proactively anticipate the surgeon's needs throughout the entire surgery. Gauze, stapling equipment, or saline may need to be refilled, and the circulating technician should be prepared to refill these items or to obtain additional instrumentation if needed. All personnel should be cognizant of the operating room and respect the sterile field. The room should be kept clean and organized.

The scrub assistant should ensure tidiness of the instrument table. All used gauze should be placed into a designated counting area to ensure nothing is left behind inside

SURGERY SAFETY CHECKLIST		
PRE-OP (Before Surgeon arrives)	INTRA-OP (To be read to surgeon)	POST-OP
<input type="checkbox"/> CPR ___ DNR ___ <input type="checkbox"/> CPR sheet <input type="checkbox"/> Confirm patient / Procedure / Positioning <input type="checkbox"/> Print signed est. ___ \$? ___ <input type="checkbox"/> Allergies? ___ Owner food? ___ <input type="checkbox"/> Owner Meds? _____ <input type="checkbox"/> Radiograph request submitted: Pre-op ___ Post-op ___ <input type="checkbox"/> BW Requested ___ Submitted ___ <input type="checkbox"/> Reviewed By: _____ <input type="checkbox"/> Anesthetic protocol complete? <input type="checkbox"/> Confirm surgical site: _____ <input type="checkbox"/> Check skin or N/A Anesthesia machine check <input type="checkbox"/> Prep ___ OR ___ <input type="checkbox"/> Antibiotic given or HOLD <input type="checkbox"/> Pre-op Text sent <input type="checkbox"/> RTC Time _____ <input type="checkbox"/> Open Dr. WW Operating Report	Date: _____ Procedure: _____ Surgeon: _____ Anesthetist: _____ <input type="checkbox"/> Anesthetic monitoring devices <input type="checkbox"/> Specific equipment available <input type="checkbox"/> Essential imaging displayed <input type="checkbox"/> Gauze: # ___ Soft: # ___ or N/A Sponge: # _____ Hemoclips: # _____ <input type="checkbox"/> Patient name/ Procedure/ Site/State <input type="checkbox"/> Inform surgeon of CPR status <input type="checkbox"/> Blades dropped Patient Label	<input type="checkbox"/> Sponge count complete or N/A Hemoclips used: # _____ <input type="checkbox"/> Marked stapling equipment <input type="checkbox"/> Scope/C-arm images iPad ___ Server ___ <input type="checkbox"/> Scope Tower: Buttercup / Blossom / Bubbles <input type="checkbox"/> Confirm charges / Implants <input type="checkbox"/> Sharps safely removed <input type="checkbox"/> Equipment problems recorded <input type="checkbox"/> Remove surgical footwrap or N/A <input type="checkbox"/> Purse string/ Tampon removed or N/A <input type="checkbox"/> Recovery concerns: ___ or none IMC vs ICU <input type="checkbox"/> Express bladder or N/A (i.e. Epidural) <input type="checkbox"/> Nail trim <input type="checkbox"/> 1 st IVC Plan: IVF ___ CRI ___ Flush ___ 2 nd Flush ___ Pull ___ <input type="checkbox"/> Specimens submitted to: _____ by: _____ EVP-Ezyvet charge _____ <input type="checkbox"/> Remove ART line / Pressure wrap <input type="checkbox"/> Cage card/Smartflow reflects patient's CPR status

Figure 1.20 An example of a surgery safety checklist.

the abdomen before the incision is closed. A kick bucket and a sponge counter bag are two examples of a designated counting area (Figure 1.22).

Anesthetist should monitor and record vital signs on a medical record every 5 min (Figure 1.23). It is important to communicate with the surgeon if a patient's vital signs are abnormal or if the patient's plane of anesthesia changes and intervention is needed. An emergency drug sheet tailored to the patient's weight should be readily available in the case of an emergency (Figure 1.24). The anesthetist may repeat the administration of antibiotic injection if needed. The patient's eyes should be lubed every 30 minutes to reduce the risk of corneal ulceration.

Postoperative Considerations

After the surgery is finished, sharp objects should be removed from the surgical field and all dirty instruments put away for cleaning. Gently remove the large patient drape and huck towels while being mindful of towel clamps. Clean around the incision site with saline. Once



Figure 1.21 Table height is adequate for the surgeon. Arms are at an appropriate working angle of 90°.

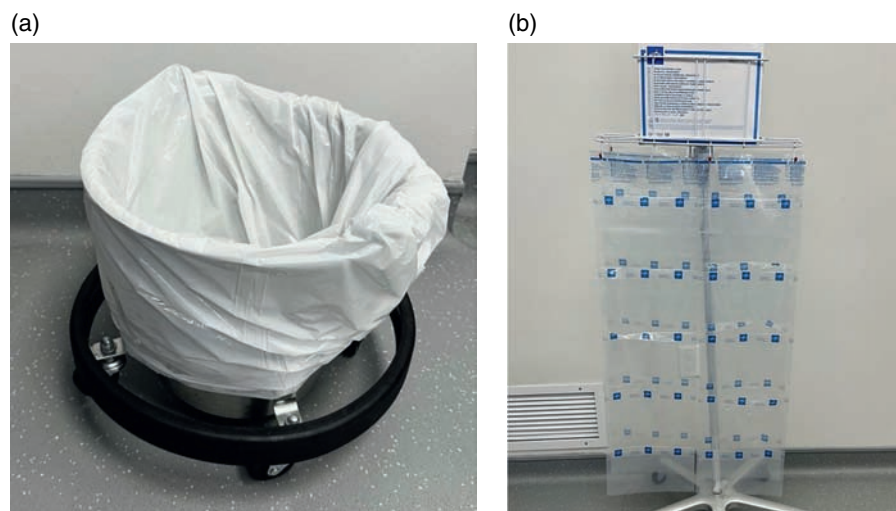


Figure 1.22 Example of a (a) kick bucket and a (b) sponge counter bag.

dry, apply an adhesive wound dressing (e.g., Primapore) to protect the incision for the first 24 hours after surgery (Figure 1.25). Before the patient is moved out of the operating room, ensure there is a recovery area ready for extubation and monitoring.

Recovery period can vary per patient, and it should never be rushed. Keep the patient warm, moisten the tongue, and apply lube to the eyes one more time. Before the anesthetic gas is completely off, ensure the patient has not regurgitated and needs attention. At this point, the patient's nails can be trimmed, anal sacs expressed, and ears cleaned if the patient is not in a critical state. Oxygenate the patient for 5 min after inhalant gas has been turned off. To prepare

for extubation, the endotracheal tube's cuff should be completely deflated and untied. The technician should be prompt to react if the patient wakes up in a dysphoric state and needs protection from hurting themselves. The patient should be kept in the recovery area until the doctor is comfortable with the postoperative vital signs.

Before the patient is moved to its recovery kennel, ensure the kennel is prepared. Examples of a well-prepared kennel include having clean and comfortable bedding, heat support, infusion pumps, and an Elizabethan collar (Figure 1.26). The doctor's postoperative treatment plan should be followed and monitoring continued until the patient is discharged into their owner's care.

Patient name	Clyde Lopez	
Doctor	K.Coleman	
Weight		5 kg

Arrest	Dose/kg	Patient dose	Concentration	Final dose in mL	
Atropine	0.04 mg/kg	0.2 mg	0.4 mg/mL	0.5 mL	Atropine
Epinephrine (low dose)	0.01 mg/kg	0.05 mg	1 mg/mL	0.05 mL	Epinephrine
Epinephrine (high dose)	0.1 mg/kg	0.5 mg	1 mg/mL	0.5 mL	
Vasopressin	0.8 U/kg	4 U	20 U/mL	0.2 mL	
Diazepam	0.5 mg/kg	2.5 mg	5 mg/mL	0.5 mL	
Antiarrhythmic					
Amiodarone	5 mg/kg	2.5 mg	50 mg/mL	0.5 mL	
Lidocaine	2 mg/kg	10 mg	20 mg/mL	0.5 mL	
Reversal					
Atipamezole	100 mcg/kg	500 mcg	### mcg/mL	0.1 mL	
Flumazenil	0.01 mg/kg	0.05 mg	0.1 mg/mL	0.5 mL	
Naloxone	0.04 mg/kg	0.2 mg	0.4 mg/mL	0.5 mL	
Defibrillation					
Monophasic (external)	4–6 J/kg			20 J	to 30J
Biphasic (external)	2–4 J/kg			10 J	to 20J
Monophasic (internal)	0.5–1 J/kg			2.5 J	to 5J
Biphasic (internal)	0.2–0.4 J/kg			1 J	to 2J
Post Arrest					
7.2% NaCl	4 mL/kg (D) 2 mL/kg 20 ml Do 10 mL CAT			20 mL DO	10 mL Cat
Mannitol	0.5 g/kg 15–20 min	2.5 g	0.2 g/mL	12.5 mL	
Dobutamine	1–10 mcg/kg/min	5 mcg	100 mcg		
Dopamine (CRI, low)	1–10 mcg/kg/min	25 mcg	50 mcg		
Dopamine (CRI, high)	10–15 mcg/kg/min	50 mcg	75 mcg		
Norepinephrine	0.05–0.1 mcg/kg/min	0.25 mcg	0.5 mcg		
Vasopressin (CRI)	0.5–5 mU/kg/min	2.5 mU	2.5 mU		
Glycopyrrolate	0.011 mg/kg/min	0.06 mg	0.2 g/mL	0.28 mL	

Figure 1.24 An emergency drug sheet.



Figure 1.25 A Primapore applied along the incision.



Figure 1.26 Moving patient to recovery. (a) Gurney for transportation. (b) Patient inside the kennel.