Mouse Laparotomy

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The viewer is strongly encouraged to view the sister presentation on rodent surgery set-up before viewing this presentation.
A general mouse surgery pack generally includes atraumatic (toothed forceps), small scissors, a few sharp pointed forceps, needle holder, fine scissors, and staple or wound clip applicator.

In addition to general use surgical instruments, a Barraquer wire speculum is useful as an abdominal retractor.
After the sterile instrument area has been prepared, the animal prepped for surgery and placed on the surgery table, and the surgeon prepared for surgery, the animal is draped with a transparent drape.

An elliptical opening is cut in the drape by grasping the drape with toothed forceps, pulling up to make a crease and cutting along the base of the crease.
The size of the opening is controlled by how “tall” the crease is when cutting at the base.

The skin grasped with atraumatic (1 X 2 toothed) forceps parallel with the incision site and elevated slightly forming a skin crease perpendicular to the incision line.
A small incision is made with scissors across the creased skin forming a shallow incision through the skin only.

Small tipped scissors are used for blunt dissection between the skin and abdominal muscle layers. The scissors are inserted under the skin closed, then opened slightly to separate the skin from the muscle layer.
The blunt dissection is performed posteriorly and anteriorly to the ends of the intended incision.

The skin is then incised posteriorly using scissors.
The incision is then carried anteriorly.

When the skin incision is complete the linea alba and the underlying abdominal organs can be visualized.
The linea alba is grasped with the forceps, elevated slightly, and a shallow nick cut through the membrane. Air will flow in and separate the abdominal wall from the internal organs.

The incision can then be extended as needed without unintentional incision of the internal tissues.
Once the incision has been completed, retractors can be inserted to keep the incision open.

The retractors are placed by squeezing the arms together, placing one arm in the incision, and then using forceps to pull the other side of the incision over the second arm of the retractors.
The tension the retractors provide can be adjusted by bending the arms closer or farther apart before inserting them in the incision.

With retractors in place, the omentum, gut loops, and internal organs can be gently manipulated using wet cotton tipped applicators.
Here the liver is being gently retracted to expose the stomach and pancreas.

Once the laparotomy has been completed the muscle layer is usually closed using a simple continuous suture pattern. A suture is passed through both sides of the incision.
A simple square knot is used to anchor the suture at one end of the incision.

The suture is passed through both sides of the incision being sure to exclude any omentum or fat from the incision line.
Holding slight tension up on the suture can help elevate the muscle layer from the underlying tissue and allow the needle to be passed through both sides of the incision in a single motion.

The sutures should enter and exit the muscles about 2-3 mm from the edge of the muscle and be placed about 4-5 mm apart. There should be no gap between the opposing muscle edges.
At the end of the incision the last two sutures should be placed only 1-2 mm apart.

Instead of pulling the suture all the way through on the last throw, a loop is formed.
And the loop used like a single strand to tie a square knot with the free end of the suture.

To ensure you tie a square knot keep the needle holders between the two ends of the suture when making your throw and be sure the two ends of the suture “trade places” after each throw.
After the second throw is tied the Loop end (A) should again be at the top of the incision.

The ends of the suture are cut close.
The completed muscle layer closure shows the edges of the incision closed with no gaps and no “blanched” tissue caused by overly tight sutures.

The muscle layer is cleaned and wetted with saline before closing the skin.
The skin is closed using staples/wound clips, or 5-0 suture using a simple interrupted suture pattern.

To use wound clips, the two edges of the skin are approximated using forceps and the wound clip placed perpendicular to the incision.
The ends of the wound clip are pressed together until the two spacing lugs contact the opposing side of clip.

Wound clips are made with small “lugs” on the ventral surface.
As the clip is closed the spacing lugs side past each other.

Until the lugs contact the opposing side.
The skin edges are again grasped and approximated.

Additional wound clips are placed approximately 4 mm apart.
Once the incision line has been closed the animal drape is removed, and the surgery site cleaned.

The instrument drape is again folded over the instruments to prevent contamination during the preparation of the next subject.