

Endoscopy: a promising diagnostic and treatment tool

ONE of the biggest challenges that cattle clinicians face when examining sick cows is the limited number of means to achieve a definitive diagnosis.

Our biggest allies in this battle are our faithful thermometer, the reliable stethoscope, our observant eyes, the rectal palpation, a limited range of biochemistry on-farm tests (BHB, ketone, blood constituents).

But most important of them all is our experience of previous cases. It has been accumulated over the years

and helps us fill the gaps that stem from the clinical examination. As we are unable to directly examine every organ of the cow, it is fair to say that in general practice our hands are tied to some extent.

Reminiscing from my university days, one of the most enjoyable subjects was anatomy. I still recall one of the exam papers where we were faced with the hypothetical scenario of being placed in a cow's limb (as in the film *Innerspace*) and we had to find our way back to the heart, via the arterial system. The purpose of this exercise was to name the arteries we would follow on route.

Putting this piece of nostalgia aside, what is evident nowadays is how much of that knowledge has become redundant since we qualified. In my opinion, the reasons for this diminishment are mainly commercial pressures. They are also due to the fact that we have very few means of conclusively examining most organs during a clinical visit.

General

Endoscopic applications are recognised and well-established techniques in human surgery, where a variety of procedures are performed

routinely. Laparoscopy or celioscopy (from the Greek *celia*, meaning abdomen) is seen as a less intrusive and labour-demanding procedure.

The above procedures are not widely used in cattle surgery, although there is a small but increasing number of cattle practices that regularly apply the technique.

Today, there are mainstream and experimental applications of

SOTIRIOS KARVOUNTZIS discusses the use of endoscopy in cattle and reviews the more popular applications which include LDA and RDA corrections, exploratory laparoscopy and thoracoscopy



endoscopy in cattle. The most popular applications of the procedure are LDA corrections, RDA (non-volvular) corrections, exploratory laparoscopy and exploratory thoracoscopy. Amongst the less frequently used procedures are umbilical hernia corrections and ovarian cyst treatments.

LDA corrections

There are three different types of LDA laparoscopic correction, depending firstly on whether the animal is standing or in dorsal recumbency. Secondly, it depends on the number of portals used in each technique.

The three different types are named after their German inventors: Christiansen, Mayer and Janowitz (two-step method).

Christiansen is carried out standing with two portals, usually either side of the last left rib. The two-step method starts like the Christiansen and completes with two more portals ventrally while the patient is in dorsal recumbency. The Mayer was introduced as a bridge between the aforementioned methods. It is carried out while the cow is standing with three portals, the third in an intercostal space and vertically below the paralumbar fossa one.



Endoscopic kit.

There are a number of advantages in the laparoscopic correction of LDAs. As a matter of routine there is no requirement to use antibiotics or NSAIDs, unless of course an individual case warrants it. The portals are small (the biggest 13.5mm) and the overall intrusion is minimal, so that the risk of contamination is low.

Because the portals are so small, they do not need suturing at the end of the procedure. The surgeon can fully visualise the target organs, all that through an 8mm wide magnifying endoscope.

For the standing methods, only one assistant is required. The animal can join the herd at the next milking following the procedure. Completion of the procedure is in just under 50 minutes, expressed as arrival, examination, correction and departure from the farm.

The large investment cost is recouped by the quick patient recovery and higher subsequent milk yields. Comparing in our practice Grymer-Sterner corrected cases with laparoscopic ones and observing them for 120 days post-operatively, it appears that the latter gave 5.1 litres more milk per day ($P > 0.05$ Stata t-test comparing of medians).

On the other hand, laparoscopically corrected cases took longer time to conceive than the Grymer-Sterner ones, by 34 days ($P > 0.05$ Stata t-test comparing of medians).

It is not clear as to why this occurred; it is consistent though with poorer fertility accompanying increasing yields. Finally, the number of treated animals that exited the herd following the procedure is 9%, whereas for the Grymer-Sterner cases it is 11%. It must be noted that the difference between these results is not statistically significant.

We all have very good reasons as to why a specific LDA technique is our chosen method, and of course they are all correct. From experience, when laparoscopic LDA corrections are introduced, the laparotomic ones practically disappear.

Exploratory laparoscopy

Exploratory laparoscopy is a powerful prognostic tool where, with minimal intrusion, an abdominal condition can be investigated further. One or two small holes, while the cow is standing or in dorsal recumbency, allow us to



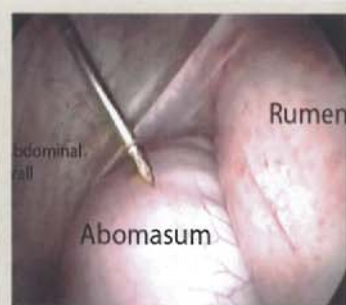
further clarify cases of general "malaise" but more importantly to comment on whether any treatment is likely to succeed.

Farmers appreciate when

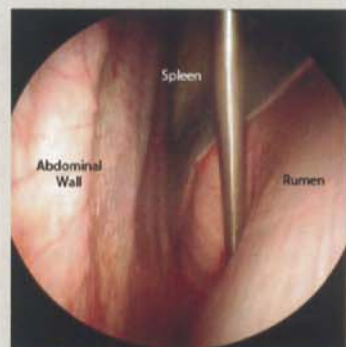
notified of the futility of a case, let alone when they are able to see it for themselves. There is nothing worse in their eyes than a treatment bill and a dead animal!

RDA corrections

Non-volvular RDAs can be corrected laparoscopically. The approach is similar to the Christiansen, the portals are located either side of the right last rib. The displaced abomasum is deflated and this must be accompanied by rehydration of the animal with large volumes of fluids in the ensuing 12 hours.



Internal view during laparoscopic LDA correction by Christiansen, from the left paralumbar fossa observing the abomasal trocar as we are about to carry out the abomasal paracentesis. The paracentesis is the precursor of the insertion of the toggle and the deflation of the displaced organ.



Internal view during laparoscopic LDA correction by Christiansen again, observing the advance of the Christiansen Spieker. The Spieker allows us to transport and fix the toggle suture ends from the dorsal left to the ventral right just caudally to the xiphoid process, while the cow is standing.