**Key words:** Horse; incisional dehiscence; laparotomy; evisceration; surgical site infection

**Summary:**

**Background:** Incisional complications are a common cause of morbidity following laparotomy. Although uncommon, acute abdominal dehiscence (AAD) is a potentially fatal post-operative complication. However few AAD cases are described in the literature.

**Objectives:** To describe common features of cases of AAD following ventral midline laparotomy, management and outcomes.

**Study design:** Retrospective case series.

**Methods:** Hospital records of horses that underwent a ventral midline laparotomy at nine hospitals in the UK, Ireland and USA over a 10-year period (2009-2019) were reviewed. Data were collected for pre-, intra- and post-operative factors that were considered relevant. Descriptive statistical analysis was performed.

**Results:** A total of 63 cases of AAD were identified. AAD occurred due to tearing of sutures through the linea alba or rupture of the body wall adjacent to the suture line in 46 horses (73%). AAD occurred at a median of 5 days (0.5-70 days) post-operatively and broodmares accounted for 25% of the cases (n=16). Surgical site infection developed prior to AAD in 28 horses (44%); leakage of peritoneal fluid occurred in 5% of horses prior to AAD being identified. Surgical repair was performed in 27 horses (43%), 10 (16%) were treated conservatively and 26 (41%) were euthanased immediately. Repair was most frequently performed using suture (n=14), wire (n=5) or a combination (n=5). Overall survival to hospital discharge was 39% (24/63). Where surgical repair was performed, 15 horses (56%) survived to hospital discharge; 9 horses (90%) managed conservatively survived to hospital discharge.

**Main limitations:** Follow-up was not performed for all cases following hospital discharge and some data were incompletely recorded in hospital files.

**Conclusions:** Previously stated causative factors for AAD were not consistent features in the present study. Surgical site infection following laparotomy and pregnant or early post-partum mares may be important risk factors for AAD and warrant further investigation.

**Introduction**

Ventral midline laparotomy is the most common surgical approach utilised to access the equine abdominal cavity [1]. Incisional complications are common, the most frequent being surgical site infection (SSI). SSI occurs in 11-42% of horses following emergency laparotomy for management of acute colic and multiple studies have identified various risk factors for its development [2].

Acute, complete dehiscence of the abdominal incision (linea alba, subcutis and skin) following laparotomy (acute abdominal dehiscence; AAD) is a less common, but potentially catastrophic event. Subsequent evisceration may result in irreversible trauma to abdominal viscera and death unless identified and managed early [3]. AAD has a reported frequency of 2-2.9% following laparotomy [3]. Violent recovery from general anaesthesia, severe postoperative abdominal pain and prolonged surgery time are proposed contributing factors [4,5]. However, there are a lack of published data about AAD and most reports are based on small numbers and/or anecdotal evidence about the cause. This makes it difficult to provide evidence-based guidelines about how AAD may be predicted or prevented, and the likely outcome in these cases.

The aim of this study was to provide additional evidence-based information about AAD in an international, multicentre retrospective study of cases of AAD following laparotomy including clinical features and outcome.

**Methods**

Cases of AAD that occurred in horses undergoing treatment at 9 university and private equine hospitals in the UK, Ireland and USA (University of Liverpool Equine Hospital, Bell Equine Veterinary Clinic, The Ohio State University Veterinary Medical Center, New Bolton Center, University of California Davis Veterinary Medical Teaching Hospital, University of Georgia Veterinary Teaching Hospital, Colorado State University, Troytown Greyabbey Equine Veterinary Services and Liphook Equine Hospital) over a 10-year period (2009-2019) were reviewed. This study included horses (defined as horses, ponies or foals) that underwent emergency or elective ventral midline laparotomy. AAD was defined as acute, complete dehiscence of the linea alba, subcutis and skin that occurred during hospitalisation or was reported following hospital discharge and involved the full or partial length of the incision based on visual inspection, post-mortem examination or ultrasound assessment. Cases of chronic dehiscence of the linea alba and progressive formation of an abdominal (incisional) hernia were excluded.

*Data collection*

Data were extracted from individual clinic records for pre-, intra- and post-operative factors considered *a priori* to be of specific interest. Pre-operative data recorded included signalment, bodyweight, previous ventral midline laparotomy, heart rate, respiratory rate, temperature, packed cell volume (PCV), total plasma protein (TPP), peripheral blood lactate, peritoneal fluid lactate and medications administered prior to surgery. Intra-operative variables included lesions diagnosed at surgery, surgical procedure performed, surgeon (Diplomate/resident status, Diplomate specialty), abdominal closure technique, anaesthetic and surgery time, lowest recorded mean arterial blood pressure and arterial pH under general anaesthesia and anaesthetic recovery score. Post-operative data included application of abdominal bandages/support devices, analgesia, antimicrobial therapy, development and duration of post-operative reflux (POR), timing of refeeding, postoperative colic (POC) or level of physical activity prior to dehiscence (e.g. excessive pacing around the stable), time between surgery and dehiscence, prior SSI as defined by incisional discharge that was mucopurulent to purulent in nature and/or documented infection as determined by culture of the incision, leakage of peritoneal fluid or superficial dehiscence (skin only) prior to AAD, length of the linea alba affected, type of abdominal viscera that protruded, and whether septic peritonitis was documented as a complication within the medical record. Heart rate, PCV, TP and peripheral blood lactate at 24 hours postoperatively were also recorded. Method of treatment (surgical repair or conservative) or euthanasia, percentage survival and time to hospital discharge were also recorded.

*Data analysis*

Descriptive statistics were performed using Microsoft Excel (2018)125a. Chi-squared tests for categorical variables and Mann-Whitney U tests for continuous variables were performed to identify associations between key factors of interest using Microsoft Excel (2018)125a and IBM SPSS Statistics (2015).b. A P value of 0.05 was considered significant.

**Results:**

*Study population:*

In total, 63 cases met the inclusion criteria and had sufficient data that could be reliably extracted. AAD occurred in horses ranging in age from 1 day to 30 years (Table 1). There were 28 mares [44%], 22 geldings [35%] and 13 stallions [21%]) and AAD occurred in a variety of breeds including draught and lightweight horses and pony breeds; no single group was overrepresented (see Supplementary item 1). Sixteen horses (25%) were used as broodmares, and 14 (22%) were in-foal or had recently foaled at the time of the initial laparotomy. Of these, 5 mares were < 36 hours post-partum, 6 in late gestation (9-11 months) and 2 mid-gestation (4-8 months). The stage of gestation was not recorded in 1 mare. Twelve horses (19%) had undergone repeat laparotomy at a median of 11 days following initial laparotomy prior to AAD occurring. Median values for continuous variables and association with survival/non-survival to hospital discharge are presented in Table 1.

*Pre-operative data:*

Penicillin and gentamicin were administered pre-operatively in 47 horses (75%), penicillin, gentamicin and metronidazole in 1 horse (2%), penicillin, gentamicin and trimethoprim sulphonamide in 1 horse (2%) and trimethoprim sulphonamide only in 1 horse (2%). Pre-operative antimicrobials administered were not recorded in 13 horses (21%).

*Intra-operative data:*

The most frequent lesions identified at laparotomy were large colon volvulus (n=17; 27%) and small intestinal strangulation by a pedunculated lipoma (n=15; 24%). A variety of other abdominal lesions were represented in the other cases (see Supplementary item 2) and intestinal resection and anastomosis (see Supplementary item 3) was performed in 23 horses (37%). Median surgery time was 120 minutes (IQR: 89-178), median duration of general anaesthesia was 142 minutes (IQR: 115-203) and was > 120 minutes in 39 horses (62%).

Abdominal closure was predominantly performed by Diplomates of the American or European College of Veterinary Surgeons (ACVS / ECVS) (n=43, 68%). Diplomates of the American College of Veterinary Internal Medicine or Emergency and Critical Care (n=2, 3%), and a third-year ACVS resident (n=2, 3%) also performed closure. The surgeon performing abdominal wall closure was not recorded in 16 cases (26%). Large-gauge braided absorbable suture was most commonly used for closure of the linea alba and comprised a range of sizes: 5 metric on a loop (n=21; 33%), 5 metric non-loop (n=18; 29%), 6 metric (n=17; 27%) and 8 metric (n=3; 5%) and not recorded (n=4; 6%). A variety of suture materials were used (Supplementary item 4).The most common suture pattern for linea alba closure was a simple continuous pattern (n=56; 89%) which may have included a second suture and subsequent knot for longer incisions, followed by simple continuous with intermittent individual sutures (n=4; 6% including 1 each of vertical mattress, near-far-far-near, cruciate or simple interrupted patterns) and not recorded (n=3; 5%). Three-layer closures were most commonly performed (n=47, 75%). There was no common suture material or pattern used for closure of the skin or subcutis (see Supplementary item 4).

Data regarding anaesthetic recovery were available for 46 horses (73%) and was difficult to assess due to the utilisation of different scoring systems. A modified score was developed, grading recovery as ‘poor’, ‘average’, ‘good’ and ‘excellent’. Of the data available, anaesthetic recovery was scored as ‘poor’ in 11 horses (24%), ‘average’ in 8 (17%), ‘good’ in 20 (44%) and ‘excellent’ in 7 horses (15%). AAD was not identified during or immediately following recovery from general anaesthesia in any of the horses. In three horses, falling in the recovery stall immediately following anaesthetic recovery was commented upon as a potential inciting cause for AAD but these data could not be reliably collected for all horses.

*Post-operative data*

AAD occurred at a median of 5 days following laparotomy (range 0.5-70 days) and during hospitalisation in 59 horses (94%). In four horses (6%) AAD occurred at 2, 4, 5 and 41 days following hospital discharge which corresponded to 13, 10, 12 and 60 days post-laparotomy respectively. POR developed in 18 horses (29%), did not develop in 33 (52%) and was not recorded in 12 horses (19%). Median duration of POR was 2 days (IQR: 1.3-3.8 days). POC developed prior to AAD in 30 horses (48%) and was reported as ‘mild’ in 8 horses, ‘moderate’ in 3 and ‘severe’ in 1; no colic signs were reported in 29 horses (46%). Level of physical activity during hospitalisation was considered ‘normal’ in 22 horses (35%), ‘increased’ in 15 (24%), ‘decreased’ in 4 (6%) and not recorded in 22 (35%).

Abdominal bandages were utilised post-operatively in 41 horses (65%) prior to AAD. Bandages were comprised of: elastic adhesive dressing n=12 (29%), elastic cohesive dressing n=10 (24%), hernia belt n=3 (7%), combination of elastic adhesive dressing and hernia belt n=2 (5%) and type not recorded in 14 horses (34%). SSI developed prior to ADD in 28 horses (44%) at a median of 5 days postoperatively (range 1-9 days). Skin dehiscence occurred prior to linea alba dehiscence in 20 horses (32%); 13 of these horses had SSI prior to dehiscence. Skin dehiscence occurred at a median of 3 days (range 1-8 days) prior to AAD. Septic peritonitis was diagnosed prior to development of AAD in 5 horses (8%). Leakage of peritoneal fluid from the ventral midline incision was reported in 3 horses (5%) prior to ADD being identified.

Failure of the body wall tissue due to tearing of sutures through the linea alba or rupture of the body wall adjacent to the suture line was identified as the cause of AAD in 46 horses (73%). Suture failure (suture breakage or knot slippage) was only observed in 4 horses (6%) and failure of both the suture and the body wall was identified in 2 horses (3%). The cause of failure was unknown / not stated in 11 horses (17%). Table 2 details visual evidence of organ or omental prolapse from the abdominal incision and proportion of horses in each group that did or did not survive to hospital discharge. In those horses that eviscerated, jejunum most commonly protruded (n=18) followed by omentum (n=6), large colon (n=6), caecum (n=1), gravid uterus (n=1) and multiple organs (n=1).

*Treatment and outcome*

Surgical repair of the abdominal wall was undertaken in 27 horses (43%), conservative treatment in 10 (16%), and immediate euthanasia was performed or the horse died immediately following AAD in 26 horses (41%). Of those horses that underwent surgical repair of the body wall, the linea alba was closed using suture in 14 (52%), wire in 5 (19%) [6] and a combination of suture and wires in 5 (19%). The suture materials used for closure of the linea alba were 5 metric lactomer on a loop (n=3), 5 metric lactomer single strand (n=4), 6 metric polyglactin 910 (n=2), combination of 6M polyglactin 910 and 6M polydiaxonone (n=2) and a double strand of 3.5M polyglyconate (MaxonTM) (n=1). Suture type was not recorded in 2 cases. Suture patterns used included simple interrupted (n=5), a combination of simple continuous and horizontal mattress sutures (n=4), or 1 each of horizontal mattress, simple continuous, simple continuous and vertical mattress, or cruciate and horizontal mattress patterns. Conservative treatment consisted of support bandages and antimicrobials to treat SSI. None of the horses that underwent conservative treatment had viscera protruding externally from the incision. Table 2 summarises survival to discharge for horses that did or did not have viscera protruding from the incision. Immediate euthanasia was performed due to clinical deterioration or a likely hopeless prognosis in 10 horses (16%) and was elected by the owner in 12 horses (19%). Dehiscence was known to have occurred following hospital discharge in 4 horses and transport to an appropriate surgical facility was only possible in 1. These 4 horses had different initial lesions (dystocia n=2), strangulating pedunculated lipoma (n=1) and non-strangulating mesenteric rent (n=1) and all 4 had developed SSI prior to AAD.

Overall survival to hospital discharge was 38% (24/63). Table 3 details percentage survival for horses managed surgically and conservatively. Of the horses that were managed surgically and did not survive, the reasons for death or euthanasia were: ongoing severe colic (n=3), repeat AAD (n=1), peritonitis (n=2), failure to stand from general anaesthesia (n=2), gastric rupture (n=1), bowel rupture during surgery (n=1) and unknown (n=1). Repeat AAD occurred in one horse that was managed surgically (wires). The only variables with a significant association with survival to hospital discharge were lowest arterial pH under general anaesthesia (p=0.04) and peripheral blood lactate 24 hours after surgery (p=0.01) (Table 1).

**Discussion**

AAD is an infrequent but potentially catastrophic post-operative complication following laparotomy and may be a cause for litigation claims against clinics. This is the largest reported case series of AAD in a multicentre, international study that provides additional evidence-based information about key features of horses that have developed AAD, areas for further investigation and assists discussions with owners about potential causes and likely outcomes. The current study suggests that features of cases and hypotheses about horses at greater risk of AAD are different to those previously reported.

AAD has previously been stated to be associated with a violent recovery from general anaesthesia [3] but this was a feature of only a proportion (24%) of horses in the present study and AAD was not recognised during or immediately following anaesthetic recovery. Whilst it is possible that initial physical disruption to the body wall may have occurred during recovery from anaesthesia or immediately after without it being identified grossly, this is an area that requires further investigation in future studies. Other potential causative factors cited include severe postoperative abdominal pain and prolonged surgery duration,[4,5] but these were not common features in the present study.

AAD occurred early following laparotomy, at a median of 5 days postoperatively. The 4 cases (6%) in which AAD occurred subsequent to hospital discharge demonstrate that AAD may rarely occur up to 70 days following initial laparotomy. Careful ongoing monitoring of the incision by the horse owner/carer and veterinary surgeon overseeing the horse’s care is therefore important, particularly where horses have developed an SSI. Contrary to previous reports [3], leakage of peritoneal fluid from the incision was not a consistent sign of impending AAD in the present study based on evidence from the case records.

AAD has also been attributed to failure of the suture material in the linea alba or knot slippage [5,7,8]. However, in the present study most cases of AAD were due to failure of the body wall adjacent to an intact suture line. The reason for failure of the body wall adjacent to the incision is not clear and local compromise to the tissues could have a variety of potential causes. AAD in people has been attributed to abdominal wall sutures being too tight or not widely enough placed [9]. Optimal methods for closure of the equine linea alba is an area that has been studied extensively both in-vitro and in-vivo utilising different suture material types, sizes, suture patterns and suture bites [8,10–14]. A continuous suture pattern had been used to close the linea alba in most of the AAD cases. This was the method performed by most surgeons at the collaborating clinics, consistent with those recommended in the literature. Without a control population it is not possible to investigate suture pattern and type used for closure of the linea alba as a risk factor for AAD. Tension is difficult to quantify and is an area for further study in prevention of AAD.

SSI developed in 44% (n=28) horses in the present study prior to AAD and is at the higher end of reported ranges in horses following laparotomy [15]. Given that SSI is a known risk factor for chronic incisional dehiscence and hernia formation, it would seem plausible to suggest that it may also be a risk factor for AAD and that careful assessment of the incision, including integrity of the linea alba is warranted in these cases e.g. at the time of removal of skin/subcutaneous sutures to allow drainage of purulent material. SSI is a known risk factor for incisional dehiscence in people [9,16–18], cited as being the most important risk factor in one study [18]. Ongoing presence of bacteria in the tissues has been hypothesised to result in prolongation of the inflammatory phase of healing, with an influx of neutrophils and matrix metalloproteinases and production of collagenase resulting in degradation of collagen and a decrease in tissue strength [19]. Further studies to confirm and quantify SSI as a risk factor for AAD and ways to reduce the likelihood of SSI, and subsequent weakening of the body wall are therefore important.

Pregnant or early post-partum broodmares and stallions accounted for a greater than expected proportion of AAD cases (25% and 21% respectively). Without a control population, it is not possible to determine whether these are risk factors for AAD or to quantify any altered likelihood of AAD in these groups of horses. Therefore this is another area for further investigation in a case-control study. Prepubic tendon rupture and body wall tears have been reported in broodmares, unassociated with abdominal surgery [20,21]. There is minimal evidence regarding physiological changes that occur in the abdominal wall during pregnancy and in the post-partum period in horses. In women, studies have shown an increase in the distance between the muscle bellies of the *rectus abdominis* and a reduction in the linea alba thickness during pregnancy which may weaken the body wall and predispose to body wall rupture [22,23]. It is unknown whether similar changes also occur in pregnant/early post-partum mares, but it would seem reasonable to monitor the incision in this group of horses, particularly where other factors such as SSI have developed. Early additional support to the body wall using abdominal bandages and other support devices results in higher abdominal bursting pressures [24] and may be considered in these high risk patients.

Increased intra-abdominal pressure such as coughing and ascites have been identified as risk factors for body wall rupture in people, increasing strain on the incision edges resulting in suture cutting through the muscle and fascia [18]. Intra-abdominal pressure is significantly higher in term pregnancies in people [25], leading to the conclusion that increased intra-abdominal pressure may also occur in broodmares, especially in late gestation, making them more susceptible to AAD. Tensing of the body wall in mares when foals nurse (LS personal observation) or excessive vocalisation (e.g. stallions) are potential hypotheses for suspected, sudden increases in abdominal pressure that may merit further exploration as risk factors for AAD in future studies. Other potential causes of increased intra-abdominal pressure in horses that may have contributed to failure of the body wall, such as post-operative colic, large colon distension [26], post-operative reflux and increased physical activity, were identified in the present study but were not consistent in all cases.

There is limited information about the outcome following AAD based on previous studies, but in the present study, short-term survival was poor (38%). Following AAD, 40% of horses were euthanased immediately either due to catastrophic evisceration or at the owner’s request. This may bias the rates of survival as some horses may have survived had surgery been performed (e.g. those euthanased for economic reasons alone). For horses that underwent surgical management, the short-term prognosis was fair (56%). Where conservative management was an option (i.e. where evisceration of abdominal contents had not occurred), the prognosis for short term survival was very good (90%). The poorer prognosis of horses treated surgically likely reflects the severity of the clinical picture rather than the efficacy of treatment. Lower arterial pH under general anaesthesia and greater peripheral blood lactate 24 hours after surgery were both significantly associated with reduced survival to hospital discharge and reflect the degree of systemic compromise intra- and post-operatively. It is not known exactly how these factors from the initial laparotomy contributed to reduced survival after AAD. It is possible that these factors also reflect the degree of tissue perfusion including the body wall and potential for increased failure of surgical or conservative management. Alternatively, these horses may have been given a poorer prognosis for survival, making them more likely to be euthanased on the basis of owner expectation.

Common to most retrospective studies, the main limitation was missing data from clinical records and lack of long-term follow up. Due to the complexities of contacting owners of horses that had undergone surgery potentially many years previously, it was not possible to collect long-term outcome data. In addition, cases of AAD that occurred following hospital discharge may have been under-reported if clinics had not been notified of this outcome. A case-control study would have been ideal to confirm and quantify risk factors for AAD but it was not possible to reliably select appropriate controls due to differences in collection of data and recording systems used by collaborating clinics. It is hoped that a newly developed international colic audit tool [27] will assist clinics in recording relevant clinical data, including short- and long-term post-operative outcomes following laparotomy. In addition to providing benchmarks for post-operative complications and outcomes, this tool may assist future investigation of complications such as AAD, facilitating selection of appropriate cases and controls where case-control studies are indicated.

This study provides new, evidence-based information from a large series of cases from multiple hospitals over a wide geographic spread that can assist in the identification and monitoring of horses at potentially greater likelihood of developing AAD. Most cases of AAD were associated with failure of the body wall itself rather than failure of the suture or associated knots as has been previously reported [28]. Horses that have had a non-violent recovery following general anaesthesia and where evidence of peritoneal drainage is lacking should not be excluded from careful monitoring for AAD postoperatively. Close monitoring of the incision and regular ultrasonographic monitoring of the linea alba are recommended in cases of SSI following laparotomy, particularly in pregnant or early post-partum mares, and in horses in which periods of increased intra-abdominal pressure or increased tension on the incision are known to have occurred. Future collaborative, prospective case-control studies are warranted to confirm and quantify risk factors for AAD following laparotomy.

**Manufacturers’ details**

a Microsoft Corporation, Washington, USA.

b IBM Corporation, New York, USA.

**Table 1:** Summary of the continuous pre-, intra- and post-operative variables at the time of original laparotomy in horses that subsequently developed acute abdominal dehiscence and differences in continuous variables between short term survivors and non-survivors (bpm=beats per minute, rpm=respirations per minute, PCV=packed cell volume, hr=hours, MAP=mean arterial blood pressure). \* P<0.05.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | N |  | Median |  |
| Median | 25th percentile | 75th percentile | Did not survive to hospital discharge | Survived to hospital discharge | P value |
| Age (years) | 62 | 11 | 6 | 17 | 12 | 9 | 0.347 |
| Heart rate (bpm) | 60 | 60 | 48 | 76 | 60 | 68 | 0.418 |
| Respiratory rate (rpm) | 51 | 24 | 16 | 36 | 20 | 30 | 0.331 |
| Temperature (arrival) | 49 | 37.8 | 37.5 | 38.3 | 37.7 | 38.0 | 0.228 |
| PCV(arrival) | 56 | 41 | 34 | 47 | 43 | 38 | 0.065 |
| Total protein(arrival) | 56 | 6.8 | 6.3 | 7.2 | 6.8 | 6.8 | 0.724 |
| Systemic lactate (mmol/L) | 50 | 2.95 | 1.58 | 4.50 | 3.10 | 2.00 | 0.509 |
| Peritoneal lactate (mmol/L) | 23 | 5.40 | 2.51 | 11.10 | 4.50 | 6.70 | 0.344 |
| Lowest recorded MAP under general anaesthesia | 47 | 56 | 45 | 65 | 53 | 60 | 0.249 |
| Lowest recorded arterial pH during general anaesthesia | 39 | 7.26 | 7.23 | 7.33 | 7.26 | 7.33 | 0.040\* |
| Anaesthetic time (minutes) | 56 | 142 | 115 | 203 | 147 | 130 | 0.536 |
| Time between surgery and dehiscence (days) | 63 | 5 | 2 | 10 | 5 | 5 | 0.712 |
| Heart rate 24hr after initial surgery (bpm) | 58 | 56 | 48 | 72 | 60 | 50 | 0.163 |
| PCV 24hr after initial surgery (%) | 53 | 37 | 33 | 44 | 38 | 36 | 0.102 |
| Total protein 24hr after initial surgery (g/L)  | 54 | 5.8 | 5.1 | 6.2 | 5.75 | 6.00 | 0.127 |
| Systemic lactate 24hr after initial surgery (mmol/L) | 22 | 2.65 | 1.08 | 3.85 | 3.20 | 1.10 | 0.013\* |
| Length of linea alba dehiscence (cm) | 39 | 15 | 8 | 25 | 15 | 15 | 0.425 |

**Table 2: Summary of outcome of horses with AAD based on visual evidence of hernation of abdominal organs or omentum from the incision.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Total number | Survived to hospital discharge (number; %) | Did not survive to hospital discharge (number; %) |
| No abdominal organs protruding from the incision  | 25 | 12 (48%) | 13 (52%) |
| Abdominal organs protruding from the incision  | 27 | 5 (19%) | 22 (81%) |
| Omental prolapse only  | 6 | 5 (83%) | 1 (17%) |
| Not recorded | 5 | 2 | 3 |

**Table 3:** Summary and outcome of horses treated surgically, conservatively or euthanased for AAD following ventral midline laparotomy.

|  |  |  |
| --- | --- | --- |
|  | Total number (%) | Survived to hospital discharge (%) |
| Surgical repair | 27 (42.8) | 15 (55.6) |
| Conservative treatment | 10 (15.9) | 9 (90.0) |
| Euthanased/died | 26 (41.3) | n/a |
| Total | 63 | 24 (38.7) |

**List of legends for supplementary items**

Supplementary table 1: Distribution of breeds.

Supplementary table 2: Frequency of gastrointestinal lesions found at initial laparotomy.

Supplementary table 3: Surgical procedure performed at initial laparotomy.

Supplementary table 4: Materials and patterns used to close the skin incision following the initial lapatoromy.

Supplementary table 5: Materials and patterns used to close the linea alba following AAD.

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