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UTERINE PROLAPSE WITH ASSOCIATED RUPTURE IN A PODENGO BITCH

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Running head: Uterine prolapse with rupture in a bitch

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Contents

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25 A case of uterine prolapse co-existing with uterine horn rupture in a 3 years-old
26 Portuguese Podengo bitch, which is an uncommon occurrence, is described. The female
27 was presented with a history of recent parturition, with delivery of 4 healthy puppies that
28 were normally tended and nursed. The situation developed after an uneventfully
29 pregnancy, and no direct causative factor was identified. The duration of the prolapse was
30 unknown but considered to be recent due to the swollen reddish appearance of the
31 tubular everted mass. No foetus was found in the uterus or the abdominal cavity. The
32 female was presented in good physical condition, without signs of shock or haemorrhage.
33 During surgical treatment the uterus was replaced to its normal position followed by ovary-
34 hysterectomy at 12h from admittance.

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37 **Key words:** uterine prolapse; rupture of the uterus; postpartum disorder; Dog.

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Introduction

Uterine prolapse in either the complete or the partial form is an uncommon postpartum condition in the bitch, though it occurs more frequently in the queen (Biddle and Macintire 2000, Mimouni 1992, Davidson 2003). According to Wood (1986) uterine prolapse in dogs is observed in less than 0.003% of animals. It might be the explanation for the fact that canine uterine prolapse is seldom referred or detailed in major veterinary reference textbooks. It consists in the exposure of one or both uterine horns through the vulva in the peripartum, up to 48h after whelping, and is and it usually consists in an obstetric emergency. It is most frequently found in association with prolonged whelping or dystocia, and the putative causes include inadequate obstetric manoeuvres, oversized foetus, laxity of the uterine ligaments due to multiple pregnancies and the changes in the endocrine background, excessive abdominal contractions, uterine atony and incomplete placental detachment (Wood 1986). In the uterine prolapse, a uterine segment passes through the cervix and vagina, when the cervix is relaxed, and protrudes at the vulva, in variable extension (Davidson 2009).

Severity of the clinical signs and prognosis depend on the duration of the prolapse and on the occurrence of haemorrhage due to rupture of the uterine vessels. Hence, on admission the female may presented no major signs except for the protruding mass at the vulva or she can evidence signs of dehydration, hypothermia and shock, the later being the most commonly described.

The rupture of the uterus is also an emergency situation. Although unusual in the bitch, it is occasionally reported as consequence of dystocia or due to fragility of the uterine walls in pyometra (Johnston et al. 2001). Other causes that may be involved in the rupture of the uterus include trauma, uterine torsion (Stone et al. 1993), forced extraction of an oversized foetus and faulty oxytocin administration (Jackson 2004, Pretzer 2008).

However, spontaneous uterine rupture frequently occurs due to unknown causes. In the

bitch, rupture of the uterus during labour has been commonly associated with very large litters, causing marked stretching and thinning of the uterine wall (Davidson 2003), and uterine torsion (McEntee 1990).

Symptoms and prognosis of uterine rupture varies individually and with the portion of the genital involved, the size and the nature of the rupture (horizontal or transversal) and the amount of uterine material that escapes into the abdominal cavity (Roberts 1970). This clinical situation may also be accompanied by other complications, such as bladder or intestine prolapse through the fissure on the wall of the genital tract (Roberts 1970).

The prevalence of uterine prolapse and of uterine rupture in bitches nowadays is not known.

This study reports a case of uterine prolapse co-existing with a spontaneous transversal rupture of one uterine horn, in the absence of reported dystocia or foetal retention, in a uncommon combination of obstetric diseases.

2. Case description

A three-year old Portuguese Podengo bitch, weighing around 11 kg, was admitted to the night emergency consultations at the Veterinary Teaching Hospital of the University of Trás-os-Montes and Alto Douro due to the acute exposition of a large, reddish mass from the vulva, following the delivery of four healthy puppies early that day.

The bitch had one first litter in the previous year, at the age of 2 years, consisting of 5 delivered puppies. That parturition, as well as the current pregnancy, was uneventfully. On admission the bitch was in regular body condition, and the rectal temperature, heart rate, respiratory rate, urine features fall within the normal parameters. The mucous membranes were pink. An in-house complete blood count (CBC) only revealed a slight anaemia (haematocrit about 25%). Table 1 details the results for the global CBC and biochemical parameters at admittance. The puppies came along with the female for

nursing, and seemed vigorous and adequately tended. The owner was not able to time the occurrence of the prolapse, but the borders of the uterine wound started cicatrisation and no internal bleeding was found.

The tissue protruding from the vulva was cylindrical (sausage-shaped), and presented transversal striation compatible with one implantation site (Figure 1A); the exposed mass included one uterine horn, which itself incorporated one intussuscepted mass that seemed to correspond to the remainder of the uterus. The cervix was not found exposed. At 3 cm of the base of the mass, in a ventro-lateral position, a transversal rupture of the uterine wall was recorded (Figure 1B). The exposed mass was swollen, congestive, with some lacerations on the surface, but without evidences of external haemorrhage or necrosis (Figures 1A and 1B). The urethral opening was visible but dysuria or stranguria were absent. A small quantity of placental debris was found at first evaluation. Abdominal palpation and ultrasonography did not evidence the presence of additional puppies in the abdomen. Moreover, none of those procedures elicited signs of pain.

Due to the clinical findings the diagnosis of uterine prolapse complicated with uterine rupture was raised.

Taking into account the general status of the female and the absence of signs for internal haemorrhage a decision on cleaning and gently attempt to reduce the size of the prolapsed mass was taken. Particular attention was made to the possibility of inducing the rupture of a uterine vessel and subsequent internal bleeding, and the owner was advised to submit the female for ovary-hysterectomy early in next morning.

The everted tissue was cleansed with a 0.5% chlorexidín solution followed by hyperosmotic solutions (30% Dextrose and 10 ml of **Mannitol 20%®, Labesfal**), which were applied topically to reduce the volume of the mass. At that moment, reduction of the

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4 121 prolapse was not achieved. The animal was submitted to fluid therapy (Ringer Lactate, B.
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6 122 Braun; at a rate of **10 ml/kg body weight per hour**) and protective antibiotic treatment
7
8 123 (Cephadrine, 30 mg/**kg**, BID; Cefradur®, Atral-Cipan, Portugal).
9
10 124 The puppies were left with their mother and both mother and puppies were maintained
11
12 125 under strict vigilance. The female was check regularly for haematocrit, heart and
13
14 126 respiratory rate, dehydration, lethargy and signs of haemorrhage. OVH was performed
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16 127 within **12h of admittance**.
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18 128
19
20 129 After pre-medication with intravenous administration of Fentanil (**2.5** µg/kg, Fentanil®,
21
22 130 B.Braun) and a combination of Diazepam (**0.2** mg/kg, Diazepam®, Labesfal) and
23
24 131 **Ketamine hydrochloride** (**0.5** mg/kg, Imalgene 1000®, Merial) the anaesthesia was
25
26 132 induced with Propofol (2 mg/kg, IV, Propofol®, Lipuro B.Braun) and maintained with
27
28 133 Isoflurane (Isoflo®, Esteve Veterinaria) and oxygen at 100%.
29
30 134 The ventral abdominal wall was prepared for aseptic surgery. After pre-medication,
31
32 135 manual resolution of the uterine prolapse was achieved through massage and cold saline
33
34 136 fluids, just followed with the prompt abdomen approach via midline laparotomy. During
35
36 137 manipulation it was fond that one uterine horn and the uterine body were invaginated into
37
38 138 the other uterine horn, which was exposed from the vulva. The ruptured left uterine horn
39
40 139 was first identified for assessment of eventual haemorrhage. In its absence, a routine
41
42 140 ovary-hysterectomy was performed. Due to leakage of uterine fluids into the abdomen,
43
44 141 peritoneal cavity was copiously flushed with warm sterile saline solution before the routine
45
46 142 closure of the abdominal wall in three layers (with Safil®, B.Braun, 2/0 for the first two
47
48 143 layers and Safil®, B.Braun, 3/0 for the intradermal suturing of the skin). At the end of the
49
50 144 surgery one single dose of meloxicam (**0.2 mg/kg** SC, Metacam®, Boehringer Ingelheim)
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52 145 was administered.
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4 147 The female made an unremarkable recovery from surgery. During the postoperative
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6 148 period, the animal was medicated with amoxicillin and clavulanic acid (22 mg/kg BID, PO,
7
8 149 Synulox®, Pfizer) for 7 days. Medical discharge was given 24h after the surgery, with
9
10 150 recommendation to maintain the puppies with their mother for tender and nursing.
11
12 151 The animal was schedule for re-evaluation at 2 and 7 days afterwards. Full recovery was
13
14 152 achieved at day 2. The owner reported the sudden death of one puppy 2 days after
15
16 153 surgery. The removal of sutures was achieved by 10 days after the operation. The
17
18 154 remainder three puppies survived to weaning, according to the owner final report.
19
20 155

21
22 156 **3. Discussion**

23
24 157 This case report describes a rarely found uterine prolapse co-existing with uterine rupture
25
26 158 in a medium-sized bitch in which normal whelping was achieved without manoeuvres or
27
28 159 help.
29
30 160 Neither uterine prolapse nor uterine rupture is a regular obstetric situation in dogs.
31
32 161 Recently, a description of a case of vaginal rupture with evisceration was described in a
33
34 162 bitch that had developed a uterine prolapse immediately after delivery of seven oversized
35
36 163 foetus (Prassinos et al. 2010).
37
38 164 Uterine prolapse, corresponding to the invagination of one or both uterine horns through
39
40 165 the cervix and vagina, is seldom diagnosed in dogs, in particular when associated with
41
42 166 parturition, when compared to other species (Mimouni 1992, Johnson 1989). More often it
43
44 167 takes place right after the expulsion of foetuses but it may also occur in association with
45
46 168 the expulsion of one of the foetus, when it may be at the origin of maternal dystocia due to
47
48 169 obstruction of the vaginal vault.
49
50 170 Partial or total uterine prolapse is relatively less common in the bitch than in the queen. In
51
52 171 a Swedish survey, Darvelid and Linde-Forsberg (1994) analysed 182 situations of canine
53
54 172 dystocia and did not found a single case of uterine prolapse, whilst in cats, for a similar
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4 173 period, Ekstrand and Linde-Forsberg (1994) reported it as accounting to 0.6% of the of
5
6 174 maternal causes of dystocia (1:155 cases).
7
8 175 Excessive expulsive efforts and oversized foetus are frequently pointed as the causative
9
10 176 factor. However, the causes of uterine prolapse are not always clear, and in the literature
11
12 177 the most cited causes also included are the inversion of the progesterone/oestrogen
13
14 178 dominance, an increased abdominal tension due to tenesmus and inappropriate
15
16 179 obstetrical technique, such as a faulty administration of oxytocin or excessive pressure
17
18 180 during manual intervention (Jutkowitz 2005, Hedlund et al. 2007, Reichler and Michel
19
20 181 2009, Gendler et al. 2007). Some of those factors have also been associated to the
21
22 182 occurrence of uterine rupture (Humm et al. 2010). The uterine rupture has been most
23
24 183 frequently associated with oxytocin administration, in particular for treatment of pyometra,
25
26 184 or to vigorous manipulation of the uterus when the uterine walls are thin and fragile, as in
27
28 185 prolonged dystocia and pyometra (Johnston et al. 2001).
29
30 186 In the case presented here, the female was left alone for whelping, having the owner to
31
32 187 monitor sporadically and infrequently the progress of labour, so the moment of occurrence
33
34 188 of the uterine prolapse was not determined. However, the female delivered four viable
35
36 189 puppies that turned to be all the puppies she had, when the owner perceived the everted
37
38 190 mass protruding from the vulva. So it is possible that it had occurred immediately after
39
40 191 delivery of the last puppy. As she was let alone for parturition, forced manoeuvres at
41
42 192 puppy delivery are improbable, though the co-existence of the rupture is suggestive that
43
44 193 local uterine overstretching might have occur during parturition, which could also
45
46 194 contributed to the occurrence of the prolapse. **The rupture was located caudally to the**
47
48 195 **annular implantation site. This, along with *per vagina* delivery of the correspondent**
49
50 196 **puppy and the absence of attached foetal membranes is highly suggestive that the**
51
52 197 **uterine rupture was consecutive to the organ prolapse.**
53
54 198

199 When approaching a clinical situation such as this, reaching a prolapse diagnosis is not
200 difficult. However, carefully evaluation of the everted mass ought to be performed to
201 distinguish between uterus or vaginal involvement, the existence of important lesions or
202 even rupture of the prolapsed tissues and eventual haemorrhages. This, along with the
203 results of the physical examination, will dictate the time to accomplish the resolution of the
204 clinical condition, as well as the most suitable treatment. The contamination of the
205 prolapsed mass should be evaluated independently, as it is associated with the place of
206 whelping and the presence of environmental detritus. Also, the uterine tissue may be
207 ischaemic or necrotic, depending on the duration of the prolapse, and although may
208 influence the treatment it is not by itself decisive for the clinical outcome.

210 Due to its rare occurrence is hard to evaluate the existence of age and breed
211 predisposition in the occurrence of uterine prolapse. According to available references, it
212 may be manifest in bitches of varying ages and breeds, and in primiparous or multiparous
213 females (Johnson 1989). Furthermore, although seldom described, it seems to be
214 independent of previous occurrence of vaginal prolapse.

215 The clinical signs at admission are largely dependent on the degree of the prolapse or the
216 extent of the rupture, the existence of haemorrhage, the contamination of the abdominal
217 cavity with uterine and foetal fluids, or the retention of a foetus in the uterus. Most
218 frequently described signs of uterine prolapse or rupture are dehydration, hypothermia,
219 depression and shock.

221 The diagnosis of a prolapse is not difficult as the owners easily perceive the existence of a
222 protruded mass in the vulva and this is usually the main complain for the appointment. A
223 carefully evaluation of the extension of the protruded structure, along with the history of
224 recent parturition should allow to classify the prolapse according to the reversed
225 structures. Vaginal prolapse or ptosis is most frequently previous to parturition, while the

uterine prolapse accompanies whelping. Also the general condition of the female usually indicates whether more severe complications exist, such as wall rupture, haemorrhage or sepsis.

For a successful treatment, early and correct diagnosis is important, as uterine prolapse can produce a life-threatening situation if severe bleeding into the abdominal cavity occurs. Differential diagnosis for the uterine eversion must include vaginal prolapse or ptosis during late pregnancy and the prolapse of an existent uterine or vaginal neoplasia.

Due to the risk for uterine rupture and haemorrhage, uterine prolapse has to be treated as an emergency situation. As uterine prolapse occurring early in parturition could impair its normal progress, it may promote foetal retention with posterior maceration. If uterine rupture co-exists, the fall of foetus into the abdominal cavity is possible, with posterior peritonitis or granuloma formation. So it is important to ascertain the presence of foetus in the uterus and the patency of the birth canal.

The most suitable therapeutic approach for uterine prolapse is surgery, in particular when one uterine horn is fully everted. Even when uterine relocation is possible, the ability to maintain a forthcoming pregnancy to term is not granted, as adequate suspensory support to the uterus may not be achieved after severe broad ligament stretching, even if uterine function may be recoverable after medical treatment. It is important to emphasize that the uterine prolapse may be associated or not to blood vessels rupture and consequent intra-abdominal haemorrhage, predisposing the animal to hypovolaemic shock (Biddle and Macintire 2000, Hedlund et al. 2007). As important haemorrhage may also be observed during uterine rupture, whenever a female also presents signs of depression, hypothermia or shock an urgency ovariectomy and blood transfusion should be immediately performed. In the present study, however, despite the co-existence of two important obstetrical diseases, the female showed good vital signs, maintained milk production and

253 remained attentive towards the puppies, which were determinant factors to postpone the
254 surgery for 12h.

255
256 To conclude, this report is a novel presentation of canine uterine prolapse with co-existing
257 uterine horn rupture. The uterine prolapse prognosis may be favourable for life, if not for
258 reproduction, even when co-existing with uterine rupture provided that the established
259 therapeutic modality is appropriate and applied according to the clinical condition of the
260 female and the organ.

261

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265

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 320 511.

323 Captions:

324 Table captions

325 **Table 1** – Clinical, haematological and biochemical parameters for the Podengo bitch at
326 the admittance.

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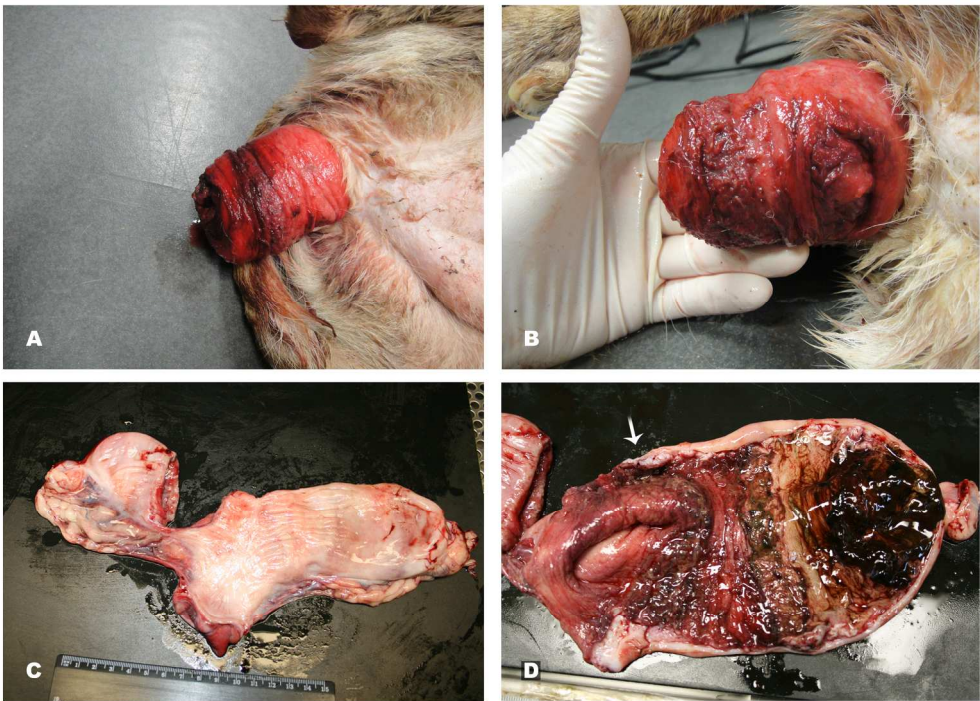
329 Figure captions:

330 **Figure 1** – Uterine prolapse in a Portuguese Podengo female. **A:** Gross appearance of
331 the prolapse, that appeared as an exposed cylindrical reddish mass with a clear
332 implantation site. **B:** Detail of the rupture point within the everted tissue. First attempts to
333 reduce the prolapse were followed by tissue exteriorization at the fissure. **C:** Gross
334 appearance of the genital tract segment obtained following OVH. A complete transverse
335 rupture of one uterine horn was observed, not accompanied by laceration of the uterine
336 vessels or the suspensory ligament. **D:** Internal appearance of the uterus with the
337 exposed area (arrow) showing the mucosa more congestive than in non-exposed areas of
338 the uterine horn.

339

Table 1 – Clinical, haematological and biochemical parameters for the Podengo bitch at the admittance.

Parameter	Units	Value at admittance	Lab reference values
Temperature	°C	38.6	38 - 39
Capillary refill time	seconds	<2	1-2
Heart rate	bpm	136	70-160
Haematocrit	%	24.6	37-55
Blood urea nitrogen	g/dL	5.8	6 - 27
Albumin	g/dL	2.3	2.1 – 3.6
ALT	U/L	39	10 – 100
CREA	mg/dL	0.6	0.5 – 1.8
GLU	mg/dL	139	77 - 150



Uterine prolapse in a Portuguese Podengo female. A: Gross appearance of the prolapse, that appeared as an exposed cylindrical reddish mass with a clear implantation site. B: Detail of the rupture point within the everted tissue. First attempts to reduce the prolapse were followed by tissue exteriorization at the fissure. C: Gross appearance of the genital tract segment obtained following OVH. A complete transverse rupture of one uterine horn was observed, not accompanied by laceration of the uterine vessels or the suspensory ligament. D: Internal appearance of the uterus with the exposed area (arrow) showing the mucosa more congestive than in non-exposed areas of the uterine horn.
439x320mm (150 x 150 DPI)

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