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# Sub involution of Placental Sites (SIPS): a Postpartum Disorder in Bitches

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## Introduction

After parturition, Uterus will revert back to preconception state termed as involution of uterus. The normal time taken for uterine involution varies from species to species, in dogs it will take about 3 ½ to 4 months. There are many postpartum or puerperium disorders that can occur after parturition in dogs (whelping) like Eclampsia (Most Frequent), SIPS, Metritis, PPH etc.

Sub involution of Placental Sites (SIPS) is seen in bitches that whelped for first time. It is characterized by delay in uterine involution due persistence of syncytial trophoblasts (some consider them as decidual cells) followed by deep invasion of these cells into uterine wall (endometrium, sometimes into myometrium) causing leakage of blood in to uterine lumen and postpartum discharge to remain active even after 6 weeks of parturition. Normally when the dog is presented to a physician with the persistence of postpartum discharge even after 6 weeks (sero-sanguineous discharge), first condition to rule out is SIPS.

**Keywords**: Trophoblastic cells, Metrorrhagia, Anaemia, Megestrol acetate.

**Aetiology:** Still unclear

**Epidemiology**:

***Prevalence*** - Commonly seen in bitches that whelped for first time, and age below 2.5 to 3 years.

***Incidence*** - *The* rate of incidence is suspected to be 10%–20 of postpartum bitches. (Kutzler MA, 2014).

***Predisposing Factors*** – Causes of premature and prolonged whelping can predispose SIPS like Mineral deficiency (calcium), Vitamin deficiency (Vitamin A), Abortion (Canine Brucellosis), Uterine Inertia etc. No breed predisposition is observed and recorded yet.

**Pathogenesis:** Not well understood but possible mechanism is;

Normally the trophoblastic cells will be degenerated (in initial days of puerperium) once placenta is detached in whelping along with the puppy, but in case of SIPS the trophoblastic cells without getting degenerated they persists and invade deeper uterine tissues (up to myometrium, can even perforate the uterus and causes death due to uterine rupture and sometimes peritonitis). Persistence of these cells lead

to lack of thrombus forming in the local endometrial blood vessels. These active placental sites, delayed uterine involution led to continuous oozing of blood into uterine lumen and clinically evident by presence of metrorrhagia (Sero-sanguineous) without possible bacterial infection. (So fertility will remain good for next breeding cycle once animal recovered from SIPS).

Normally Postpartum secundi/lochia is seen only for few days after whelping, usually this discharge will be green colour initially and later becomes reddish. The volume of discharge decreases (ml to few drops) and disappear (in about 3 weeks), but in SIPS this discharge (sero-sanguineous) persists for prolonged period (more than 1 ½ months).

**Clinical Signs:**

Clinical signs are usually non- specific; animal will be active and alert, but only compliant by the pet owner is presence of reddish to dark vaginal discharge even after several weeks of whelping. The amount of sero-sanguineous discharge noticed vary from few ml to huge quantity (severe loss of blood lead to hypovolemia, anaemia and sometimes death).

Signs of anaemia are noticed (if blood loss is severe). Thrombocytopenia is also noticed in some cases. (One case is reported in Maltese terrier by Jilli Crosby *et al.*, 2022). Sometimes clinical signs subside for few days and later reoccur.

**Diagnosis**:

Based on clinical signs diagnosing SIPS is impossible because metrorrhagia can be due to many other causes. Differential diagnosis and ruling out is necessary. Many diagnostic aids are available that suggests the case as SIPS but confirmatory diagnosis can be only made from histopathological examination.

For histopathological examination, sampling of uterine tissue can be done by biopsy or examining it after ovariohysterectomy.

**Histopathology of Uterus:**

- *Macroscopic lesions*: Dark coloured, enlarged and thickened zonal some or all placental sites with evidence of haemorrhages. Inter-placental sites appear to be normal.
- *Microscopic lesions*: SIPS are characterized by a luminal coagulum of abundant necrotic cellular debris, hemorrhage, and within the deeper layers of endometrium, syncytial trophoblasts or decidual cells that have a vesiculate nucleus and highly vacuolated cytoplasm due to progesterone stimulation. The retained trophoblastic cells fail to degenerate and subsequently invade into the deeper glandular layer and myometrium. (Al-Bassam MA *et al*., 1981 and Dr. Dalen Agnew, 2019). Endometrial glands will be enlarged & local blood vessels congestion also can be noticed.

Other aids;

*Trans abdominal palpation*; reveals uterine distension with palpable masses (distended eosinophilic masses).

***Ultrasonography*;** (non-conclusive) B-mode trans abdominal ultrasound is usually done. It reveals absence of foetal and placental tissues, delayed involution & distension of uterus (fluid filled) with



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heterogeneous content (avascular luminal content). Enlarged implantation sites (MM Rivera del Alamo,2017). The placental sites will be hypoechoic and anechoic areas also can be noticed due to presence of fluid in the uterine lumen.

***X-ray*;** Distended uterus with thickened uterine wall.

***Vaginoscopy*,** reveals presence of sero-sanguineous discharge in vagina.

*Vaginal Cytological examination*; Erythrocytes (due to bleeding from placental sites) and Trophoblast-like cells can be observed. These trophoblastic cells are syncytial, multinucleated, large and highly vacuolated. Presence of these cells in initial days of whelping is normal but should be persistent for prolonged period. Absence of these cells in vaginal smear will not rule out SIPS (MM Rivera del Alamo,2017). So vaginal smear alone should not be used as confirmative diagnostic aid.

CBC and Biochemical panel; will not show much changes except in severe anaemia (shows low haemoglobin and low PCV, values vary with intensity and degree of blood loss).

According to Hans-Klaus Dreier, 2003; Subinvolution of the placental areas is recognizable on colposcopy as a low-grade bright red to red-brown VD, and on palpation by the ampullary uterine swellings, from the size of a pigeon's egg to that of a hen's egg, in the area of the placental sites (ultrasound). The patients have low grade anaemic mucosa and very largely unimpaired general health.

**Differential Diagnosis**: Initial differentiation should be done between haematuria and metrorrhagia (by urine examination and ultrasonography), then other causes of Postpartum persistent metrorrhagia should be ruled out. Ex// Trauma, Infections (Canine Brucellosis), tumours, Coagulation disorders (Poisoning, Blood parasites) etc.

**Complications** (Rare in occurrence);

- Uterine Rupture & Peritonitis,
- Severe anaemia & Thrombocytopenia,
- Hypovolemic shock,
- Secondary infections
- Death.

**Treatment**

Many protocols have been studied across the world but only few are effective;

Ecbolics-

- Ergonovine @ 0.2 mg/15 Kg. Body weight as single dose intramuscularly (B. Bibin Becha *et al*., 2022).
- Efficacy of postpartum prophylactic dose of Oxytocin to prevent SIPS is not proved yet, nor as an effective drug for treatment.
- Use of ecbolics has minimal therapeutic value in SIPS and not much effective.

Progestins-

- Oral doses of progestagen (according to study done by M J Voorhorst et al., 2013); Low oral doses of a progestagen (megestrol acetate, 0.1 mg/kg body weight (bw) once daily for the 1st



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week, then 0.05 mg/kg bw once daily for the 2nd week is effective in stopping persistent sanguineous vaginal discharge in bitches with SIPS, with neither side effects nor reduced subsequent fertility.

- Another study where bitches with persistent postpartum uterine hemorrhage were treated with a single subcutaneous dose medroxyprogesterone acetate suspension (2 mg/kg bodyweight) vulvar discharge disappeared on day three. (Arbeiter K, 1975).
- When therapy is warranted to stop prolonged postpartum vulvar discharge due to SIPS, oral low dose progestin therapy is effective and probably safe (J.C. van Brederode, 2012).

Ovariohysterectomy is indicated, if the condition is not improving by oral progestin therapy or continuous heavy bleeding is noticed. Surgical treatment is usually ovariohysterectomy, but hysterolaparatomy with curettage of selected sites has also been reported (Mschelia GD *et al*., 2001).

*Supportive therapy*:

1. Use of antibiotics in order to prevent chances of secondary bacterial infection (usually less).
2. Immediate Blood transfusion is indicated if an animal lost a huge amount of blood and has low haematocrit value.
3. Use of Styptics and haematinics (oral/parenteral) is indicated to reduce the bleeding from site and improve erythrocytes synthesis (in mild anaemia cases) respectively.

**Conclusion:** Sub involution of Placental Sites (SIPS) in some cases resolves on its own but progestin therapy or ovariohysterectomy (based on severity) is indicated for many cases. Chances of SIPS leading to peritonitis (due to uterine perforation) is usually rare but in order to rule out, thorough examination of animal and use of ultrasonography and x-ray is necessary. Coagulation studies can also be done to differentiate from other causes of metrorrhagia. If blood transfusion has been done for the bitch follow ups, regular monitoring of health and examination for post transfusion complications is required. Until there are complications usually SIPS won't affect the fertility of animal, so after giving adequate sexual rest breeding can be allowed (in subsequent estrus).

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