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Adhesions following cystotomy in dogs

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Cystotomy is indicated for removal of cystic caliculi, neoplasia, diverticulum, unresponsive haemorrhagic cystitis and for exploratory purposes. Different sites for bladder incisions have been suggested, viz dorsal (Archibald 1965) and ventral. Noordry and Trotter (1963) and Hickman and Walker (1980) preferred dorsal cystotomy because of less chance for urine leakage and avoidance of post-operative adhesions of the urinary bladder to the ventral abdominal wall. Hence, the present experimental study was undertaken to investigate the extent of adhesions that develop following dorsal and ventral cystotomy and evaluate the usefulness of poly-vinyl pyrrolidone in dogs in reducing abdominal adhesions following cystotomy.

The study was conducted on 32 healthy mongrel bitches divided into 4 groups of 8 animals each. Dorsal and ventral cystotomies were performed in groups 1 and 2 respectively. In group 3, 2% solution of polyvinyl pyrrolidone was introduced, intraperitoneally, in an attempt, to study its efficacy in reducing the adhesions. The dogs of group 4 served as controls. All the animals in 4 groups were premedicated with triflupromazine hydrochloride @ 1 mg/kg bwt given intramuscularly about 30 min before general anesthesia. The dogs were anaesthetized with thiopentone sodium 2.5% solution @ 25 mg/kg bwt, intravenously 2.5% solution. These animals where placed in dorsal recumbency and the operation site at ventral abdominal region was prepared in the routine manner for aseptic surgery. In group 1 following laparotomy urinary bladder was exteriorized and gently pressed to evacuate the urine. After full evacuation the vascular area on the ventral aspect of urinary bladder was exposed. An incision of 2-4 cm was made on the dorsal surface of fundus in the least vascular area. The bladder incision was closed by a single row of continuous Lembert's suture using 3/0 chromic catgut. The urinary bladder was replaced in its normal position. The omentum was drawn back and replaced over the urinary bladder. Before closing the abdomen, 60ml of sterilised 2% solution of polyvinyl pyrrolodine was poured in to the peritoneal cavity. The skin incision was sutured with monofilament nylon using horizontal mattress sutures. In group 2, an incision of about 2-4 cm was made on ventral aspect of bladder. In group 4 the urinary bladder was exteriorized and replaced at its original position. Clinical signs, gross pathological changes and histopathological examinations were studied in all groups.

The temperature, pulse and respiratory rates in all animals of all the 4 groups remained within the normal range throughout the observation period indicating that all the animals tolerated the operation well. However, haematurea was noticed in the animals of groups 1, 2 and 3 during the first 1 or 2 micturitions in the immediate post operative period. This was considered to be a normal sequelae of urinary bladder surgery. Observations of the bladder at postmortem examination in dogs of group 1 on post operative day seventh indicated that healing progressed well. Wound healing on both the mucosal and serosal aspects seemed to be adequate with the suture line on both the surfaces barely discernable. The suture line on the serosal aspect could be identified only by the presence of adhesions between the bladder suture line and other tissues. This was because of the inversion type of sutures employed bringing the serosal surfaces into proximity. Fusion on mucosal surface was also equally good and it would not have been possible to identify the suture line but for the presence of small submucosal haemorrhagic spots around. Similar submucosal haemorrhagic spots were also noticed in all animals sacrificed on post operative day 15 but to a lesser degree, indicating that they were not of much significance and get resorted as healing progresses.

Almost similar gross pathological changes were noticed in all the dogs of groups 2 and 3 suggesting that neither a change in the site of bladder incision nor addition of a 2% solution of polyvinyl pyrolidone altered the gross pathological changes produced by surgical encroachment of the urinary bladder in dogs. Evidence of urine leakage was no observed in any animal of groups 1, 2 and 3.

In group 1, the adhesions between abdominal suture line and the omentum was a constant finding. Adhesions were

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also formed between the broad ligament of uterus and bladder suture line in 7 dogs. In the animals of group 2 adhesion of the omentum both to the abdominal was and bladder suture line was noticed in all the animals. Almost similar observation regarding formation of adhesions following dorsal and ventral cystotomies was also reported by Desch and Wagner (1986). Polyvinyl pyrolidoine as used for supplementing blood transfusion and is stated to be a safe and efficient plasma substitute (David *et al.* 1968 and Brander and Pugh 1977). The intra peritoneal use of 60ml of a 2% solution of polyvinyl pyrrolidone was well tolerated by all the animals of group 3. Postmortem examinations made in groups 1 and 3 showed that polyvinyl pyrolidone neither interfered with the progression of healing nor did it cause changes in other abdominal organs in any of the animals. It is evident that PVP is safe for use in dogs at the said concentration and it also, to some extent, reduces the occurrence of adhesions. Similar observation following caesarean section in cattle was made by Bostedt and Brummer (1969).

Microscopic examination of the sections obtained from the bladder wall at the suture line from the animals of group1, 2 and 3 indicated that the healing progressed adequately by post operative day 7 and almost complete with serosal and muscular union and complete mucosal regeneration in all the animals by post-operative day 15. However, in the sections of group 2, epithelial regeneration under the scare tissue and subsequent sloughing of the scare tissue was noticed. Since the histopathological picture was similar in the 3 groups, the said changes cannot be attributed to the presence of PVP in the animals of group 3. It may therefore, be safely assumed that PVP has some useful application and not adverse effects. The use of PVP was safe and helpful to some extent in reducing the occurrence of adhesions.

SUMMARY

The extent on adhesion developed following dorsal and ventral cystotomy was studied. The usefulness of polyvinyl pyrolidone in reducing this adhesion was also studied in dogs. The PVP was found useful in reducing the occurrence of adhesions.

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