

Surgical Grafting of Pig's Diaphragm in a Dog with Rectal and Perianal Adenoma and Epithelioma After Removing the tumor Mass; an Alternative for Expensive Chemotherapy Treatment

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Abstract

Dealing with veterinary oncology cases is often a great challenge for veterinarians in Himachal Pradesh. Only chemotherapy available for benign tumors is Vincristine which is ineffective against perianal and rectal tumors. Not only the wide range of presenting signs and cancer types require a veterinarian to be constantly vigilant, but also the high prevalence rates of some cancers mean that the battle against cancer in pets is seemingly constant. Acellularization of xenogenic biomaterials has been highly desired for implantation without considerable adverse inflammatory and immune responses. In a prospective non-randomized study, we evaluated the effectiveness of grafting the pig's diaphragm (freshly sacrificed) into the dead space created post-surgery in the rectal, anal and perianal regions in a Labrador dog (aged approx 4 years) suffering from perianal adenoma and epithelioma in Veterinary Polyclinic, Rampur Bushahar. The graft got rejected after 8 days of surgery. We performed another grafting surgery with fresh pig diaphragm which again lasted for next 8 days, the healing of the tissue below the grafted pig diaphragm was seen upto 80%. After 2 months of surgery tissue healing upto 90% was observed. This indicates that even if the graft gets selected or rejected the healing of the tissue happens and the post-surgery dead space got healed using this technique. Both way graft has its importance. Hence this technique of xenografting pig's diaphragm into the skin tissue of dog is better alternative for expensive chemotherapy which is commonly used in peri-anal adenoma treatment.

Keywords: Dog; Peri-Anal Tumor; Pig Diaphragm; Grafting; Tissue Healing

Introduction

According to the World Health Organization [14] International Histological Classification of Tumors of Domestic Animals perianal tumors can be classified in three groups: adenomas, carcinomas, and tumor-like hyperplasias – epitheliomas. Epitheliomas, which are low-grade malignant tumors, are clinically still considered as benign entity [2,3,7,13]. Perianal tumors arise from the perianal glands (circumanal or hepatoid glands) and are very commonly found in older, intact male dogs, but very rare in female dogs [1,4,7,9,15]. Perianal tumors may occur as solitary or multiple lesions [9]. Perianal benign tumors (adenoma and epithelioma) constitute one of the most common canine skin tumors and predominantly occur in male dogs due to the androgenic dependency of the

perianal glands and their tumors [1,15]. Perianal adenocarcinomas occur less frequently representing only 3-7% of all perianal neoplasms [1,7,9]. Perianal adenocarcinoma do occur in intact as well as castrated males, suggesting no hormonal dependency [16]. Recent studies, however, demonstrated an increased androgen receptor expression in perianal adenocarcinomas, indicating the need for further studies to evaluate the hormonal control of this neoplasm [7,9]. Perianal adenocarcinomas look similar to benign tumors but tend to grow faster, are firmer, more frequently ulcerated, usually adhere to the anal and rectal tissues, and frequently recur following treatment [16]. The treatment for benign perianal tumors in the male dog is removal by surgery or cryosurgery in combination with castration [4,6,16]. Some authors describe also castration alone

as an effective treatment of perianal benign tumors [15]. In addition, the growth of benign perianal tumors can be slowed down following estrogen therapy. However, only the temporary effect for the neoplasm regression and the potential risk of severe myelosuppression following estrogen therapy, limits its use [15]. Dogs with perianal adenocarcinomas without lymph node involvement and distant metastases are usually treated by a wide surgical excision in combination with cryosurgery or radiation [11,16]. Usually treated with electrochemotherapy [8,10] which is quite expensive using chemotherapeutics like cisplatin and bleomycin. For a limited number of cases, following surgical excision, lymphadenectomy, intraoperative radiation to the lymph node bed, and external beam radiation to the lymph node may be useful in slowing down disease progression, although the cost and availability of radiation make this approach a rare alternative for most of the clinicians [5,15].

Xenografting with diaphragm is already a success in animal studies [12]. Pig has been used as a cadaver for many organ transplants even in humans as well as in dogs, so we chose pig diaphragm which is an elastic tissue and grafted it in the dead space created after removal of perianal, anal and rectal tumors. We created an artificial rectum using pig’s diaphragm and sutured it to the dog’s left out rectal tissue.

Materials and Methods

One male intact dog was selected which was suffering from perianal adenomas previously and was operated by local vet for that before the case was presented to us (Table 1). Re-occurrence of the tumor happened just in 3 months of the surgery that was done by a local veterinarian. This study was a prospective non-randomized study and was conducted to prolong the life of the suffering dog. The tumor was benign in nature confirmed by tissue biopsy of tumor tissue sent to GADVASU, Ludhiana. Chest and abdominal radiography (X-ray) was done to check whether the tumor is metastatic or not. No metastasis was observed in radiographs. Written informed consent from owner was obtained before the beginning of treatment. Testosterone levels could not be done in local laboratories, so as to rule out the hormone dependant tumors we castrated the dog. Eligibility criteria included dogs with normal hemogram and biochemistry results. Owner of the dog was made the surgical procedure understood before doing the surgery.

The diaphragm of freshly sacrificed pig was collected and was brought in normal saline to the OT in a sterilised kidney tray. The dog was given pre-operative Inj. Atropine sulphate @0.02mg/Kg intramuscularly. After giving pre-operative treatment surgical site was prepared. In the gap of 15minutes anaesthetics were given i.e., Inj. Xylazine @2mg/kg i/v, Inj. Ketamine @10 mg/kg i/v. Maintenance of anaesthesia was done with Inj. Ketamine at 50% of initial dose followed by 33% of initial dose inta-venously.

The suture material used was absorbable vicryl 2-0 (synthetic absorbable suture) for rectal tissue, vicryl 1 no. for muscles and sub-cutaneous tissue suturing and for the skin non-absorbable nylon suture 1 no. was used.

A test tube was inserted into the rectum and then the edges of the rectum were sutured with the cylindrically shaped diaphragm tissue of a pig and it was extended to outside and was further sutured with the surrounding tissue having blood supply. The perianal skin and muscles were removed while removing the tumor, so a dead space was formed at the site of tissue removal. The dead space was covered by grafting the elastic diaphragm tissue of pig on that site.

The dog was treated with antibiotics, anti-inflammatory, laxatives and multivitamins. Dog was given Inj. Ceftriaxone 500mg for 14 days, Inj. Melonex 0.2mg/kg body weight i/m for 5 days, Syp. Digytone @2.5 ml OD orally for 14days, Syp. Zipvit @ 7 ml OD orally for 7 days. We advised the owner to keep the grafted site to be clean and to keep it moist at regular interval using sterile water so that the cadaver tissue do not get dried and necrosed.

We fixed a poop bag that was made by us using an Endo-tracheal tube (8No. Size) one end into the rectum and in other end polythene was tied. The stool the dog passed got collected in the polythene bag and when it got filled with faecal matter we replaced the polythene bag.

Results and Discussion

Our study demonstrates that grafting with diaphragm of pig after removal of primary perianal tumor in dogs can be used as a tool to heal the dead space created after removal of big lump of tumor.

Patient No.	Breed	Age	Sex	No. of tumors	Tumor types	Castration	Observation for months
1.	Labrador	4yrs	M	4	Benign tumors	yes	6 months

Table 1: Patient’s and tumor characteristics.

Figure 1, 2: Tumorous mass in the peri anal- region of the dog (12 cm diameter).

Figure 3: Grafting of the pig's diaphragm done on the dog's skin as dead space was very large.

Figure 4 and 5: Artificial poop bag made using an endotracheal tube and in the end of ET tube fixed one disposable polythene bag.

As already many xenograft surgeries have been proved successful in humans as well as in animals [12] Furthermore, this surgery along with supportive therapy resulted in prolongation of the life of the diseased dog.

Healing of the tissue upto 80% in just 16 days post grafting sur-

gery was seen and after that dog's tissue healing process was undergoing by itself, it was advised to the owner that not to soil the surgical site and for doing the daily cleaning and dressing. Poop bag was kept intact for next 2 more months.

During first graft surgery initially upto 5 days of surgery there

was vascularisation seen in the edges of the graft, but from 6th day rejection started in 20% area and on day 7 it was 50% and on day 8 approx. 75% tissue showed graft rejection as tissue became darker in colour and no pink tinge was there. After removal of the grafted tissue internal healing of the dog's tissue was seen upto 40%. So, we planned another grafting after 1 day to achieve more healing. We grafted another pig's diaphragm on that site, this time healing was upto 80%, skin and muscles of the dog showed remarkable healing just in 16 days. We fixed a poop bag which was made by us using an endotracheal tube and a polythene bag tied at the external end for defecation ease for the dog. Tissue healing upto 90% was observed just in 2 months of time period.

The dog survived for 6 months after the surgery and was active a day prior to its death. One day suddenly the dog died due to unanimous reasons.

Conclusions

This study indicates that approx. 90% healing took place at the tumor removal site where a large dead space was formed post-surgery, within the time span of just two months. This indicates that grafting with pig's diaphragm in dogs is a good alternative surgical approach to current treatment modalities for non-metastatic canine perianal tumors, especially adenomas and epitheliomas which usually involve very expensive chemotherapies which are not easily available for dogs in Himachal Pradesh.

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