A PILOT, UNCONTROLLED STUDY OF POSTSURGICAL TREATMENT WITH MONOCYTE-DERIVED AUTOLOGOUS DENDRITIC CELL IN 19 DOGS WITH MAST CELL TUMOUR GRADE III

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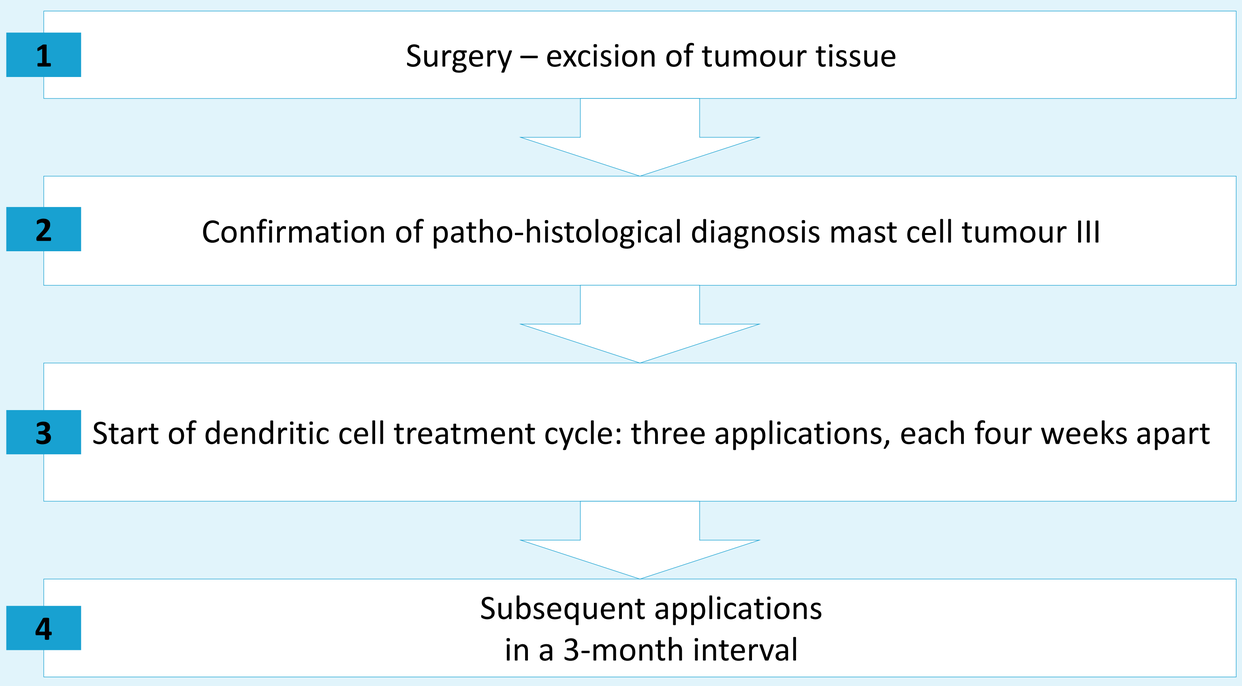
Introduction

Mast Cell tumour (MCT) is the most common cutaneous tumour in dogs, being about every fifth skin tumour. Mostly older dogs (8-9 years) are affected. There is no information about disease correlation with the weight of the dogs or the sex. Most MCTs are seen in mixed breeds, but an increased risk for mast cell tumours is seen in breeds of bulldog descent: Boxer, Boston Terrier, English Bulldog, Pug. Also Retriever breeds, Cocker Spaniels, Schnauzers, Stafford-shire Terriers, Beagles, Rhodesian Ridgeback, Weimeraner and Shar Pei are known as breeds with increased risk. Due to the accumulation of the disease in individual breeds, a genetic basis is assumed. We reviewed patients who had under-gone a dendritic cell (DC) treatment after surgical excision of a mast cell tumour grade III. We investigated the survival times after this combination treatment surgery – immuno- therapy. Often very short survival times are reported for canine patients with a MCT grade III. To prolong the survival, a new post-treatment modality was used: the dogs underwent autologous DC therapy after surgical excision of the tumour. After histopathological differentiation and classification as a MCT grade III the immunological treatment started. In collaboration with the referring veterinarians nineteen patients – treated between 2017 and 2022 could be included in this study.

Material & Methods

Since DCs possess very strong antigen-presenting capabilities, they are an attractive cell type for cancer vaccine strategies (5). Through the research of Steinman and Peters (5, 6-9), this therapeutic approach was developed in the 1980s. In veterinary medicine, immunological treatments with DCs have been used since the 2000s. We will discuss the therapeutic use of DC therapy in the treatment of canine MCT grade III. Excision of the tumour tissue was used to reduce the tumour burden for the dogs and to classify the MCT grade III. Only a few dogs underwent a staging, so there is no knowledge about metastatic disease for the whole patient group.

A fresh whole blood sample in a closed citrate-system was drawn from the patients by the veterinarians. The desired amount is 1 ml of whole blood per kg body weight, minimum 7 ml. In a clean room environment, the patient blood sample was processed by gradient centrifugation and an adherence step to obtain a population of the patient's monocytes. These monocytes were cultivated with specific cytokines (GM-CSF and IL-4) to derive autologous dendritic cells. Subsequently, the DCs were cultured for 7 days. On the final day, the DCs were harvested, resuspended and sent back to the referring veterinarian to be injected intradermally.



Result

Among the 19 dogs in the study, the following breeds were included: three mixed breeds, two each of English Bulldog, Labrador, Golden Retriever and one each of Beagle, Shar-Pei, German Shorthair, Havanese, Australian Shepherd, Magyar Vizsla, Miniature Schnauzer, Mexican Naked Dog, Terrier Mix and Irish Wolfhound. The dogs had an average age of 9,6 years (5,2 to 15,5) at the onset of the immunologic treatment. 3 of the 19 dogs are still alive at the end of this study (at 694, 688 and 1625 days). The average weight of the animals was 23,9 kg (5,8 to 60 kg). 11 dogs were female, 8 dogs male. The tumours were found in the following locations: five in the limb area, three in the lip area, two each on the chest wall and in the scrotum area. The ear or eye area, the shoulder and the lower abdomen (mamma) were affected once each. The censored mean overall survival of the patients after surgery is 531 days, the median survival time 311 days. The shortest survival time was 59 days, and the longest reached 1963 days. Three of the nineteen dogs are still alive at the time of poster presentation.

One-year survival was 36.8% (7 of 19 dogs), six-month survival was 69.5% (13 of 19 dogs).

Conclusion

Survival time and treatment options in dogs with an MCT III is a difficult phenomenon to discuss with owners. Therefore, the use of immunotherapy with DCs was investigated in this study to show treatment opportunities which are easy to use.

The result for the treatment sequence autologous immunotherapy with DCs after surgical excision of the tumours is a median survival time of more than 300 days for the cohort. Almost 40 percent of the dogs were still alive one year after treatment.

Studies should be performed with a larger number of animals to confirm the effectiveness of the treatment combination of surgery and immunologic treatment. The inclusion of other treatment methods, such as tyrokinase inhibitors or radiation, should also be used to add more treatment parameters.

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