Rare Spontaneous Proliferating Tumour in Rat: Fibrosarcoma

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Summary
A 1 year old, male Wistar rat presented to clinic having a subcutaneous greyish-white mass extending to the supraorbital area of the left eye. The stained impression-smear in the microscope small field showed bunches of round cells in diffused masses, which were present in various stages of cell division. Large numbers of cells were present in the mitosis phase. Large populations of neoplastic spindle cells, rare pleomorphic multinucleated cells, and rare leukocytes were observed. The primary tumour was characterized by fusiform spindle cells producing various amounts of interlacing bundles of collagen. The spindle-shaped cells contained moderate amounts of eosinophilic, fibrillar cytoplasm with an oval nucleus, coarsely clumped chromatin, and one or more nucleoli. Some of the round cells were present in the nucleolar remoulding stage and the presence of immature proliferating cells had previously been identified as spindle cell fibrosarcomas. During progression, the tumour acquires self-dependence and the ability to invade other tissues and metastasize. The primary tumour was characterized by fusiform spindle cells producing various amounts of interlacing bundles of collagen. The cells formed a characteristic herringbone pattern and mitotic figures were frequent. The relationship to human fibrosarcoma is noted.

Introduction
Fibrosarcoma is the tumour composed of collagen fibre-forming mesenchymal cells of fibroblasts and they arise from subcutaneous tissue (*Stout, 1948*). The tumour may occur in any tissue site but is most common in deep soft tissue of the lower extremities and followed by the upper trunk. There are numerous reports regarding fibrosarcoma in the head and neck (*Greager et al, 1994*) including the nasal cavity, para-nasal sinuses and naso-pharynx (*Heffener and Gnepp, 1992*). The tumour may present different degrees of differentiation: low grade (differentiated), intermediate malignancy and high malignancy (anaplastic). Depending on this differentiation, tumour cells may resemble mature fibroblasts (spindle-shaped), secreting collagen, with rare mitoses. These cells are arranged in short fascicles which split and merge, giving the appearance of "fish bone" known as a herringbone pattern. Poorly differentiated tumours consist in more atypical cells, pleomorphic, giant cells, multinucleated, numerous atypical mitoses and reduced collagen production. Presence of immature blood vessels (sarcomatous vessels lacking endothelial cells) favours cells in the bloodstream metastasizing.

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Materials and Methods
History, clinical examination
A Wistar male rat of age 1 year weighing 182 gms was presented to the clinic with the history of swelling around the left eye. There was continuous oozing of blood from the growth from the last 4 days. There was a history of anorexia and head tilt during

the previous week along with head pressing against the cage wall over the last three days. On physical examination a soft ulcerative growth was observed near the lateral canthus of left eye. The growth had covered the left eye completely. The rat had 103.5°F temperature and mild dehydration. The size of the ulcerative swelling was 3.3 cm. An impression smear from the ulcerative swelling was taken for cytological examination, stained with Leishman stain and observed under a light microscope (Olympus BX61).

Treatment and follow-up

It was decided to remove the tumour surgically. The rat was anesthetized with a combination of Xylazine at the dose rate of 5mg/kg and Ketamine at dose rate of 50mg/kg. The site was prepared aseptically as per standards and the tumour was excised. The bleeding points were cauterized and skin was sutured with 2-0 Nylon. Antiseptic dressing was applied and Sporidex suspension was prescribed for 5 days. Sutures were removed after 10 days. The rat made an uneventful recovery.

Result and Discussion

Grossly, the tumour arose as a subcutaneous greyish-white mass, multicentric soft sessile/ pedunculated smooth nodules or tall warty growths, which became large cauliflower like and of multiple confluencing appearance adjacent to the supra-orbital area. The surface of the tumour was multilobular with dense fibrous capsule (*Singh, 2005;Hanes, 1995*). Simple impression smear cytopathology technique confirmed the diagnosis (*Debbie, 2012*). The stained impression smear showed, in the small field, bunches of round cells in diffused masses, present in various stages of cell division (Figure 1 and 2). Large number of cells were present in the mitosis phase (*Hillyer and Quesenberry, 1997*).

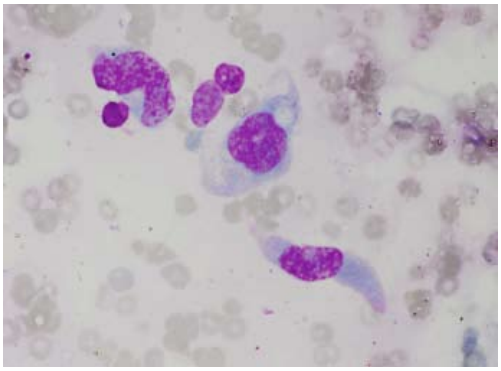

Figure 1. Rat after being operated and the tumourous growth removed.

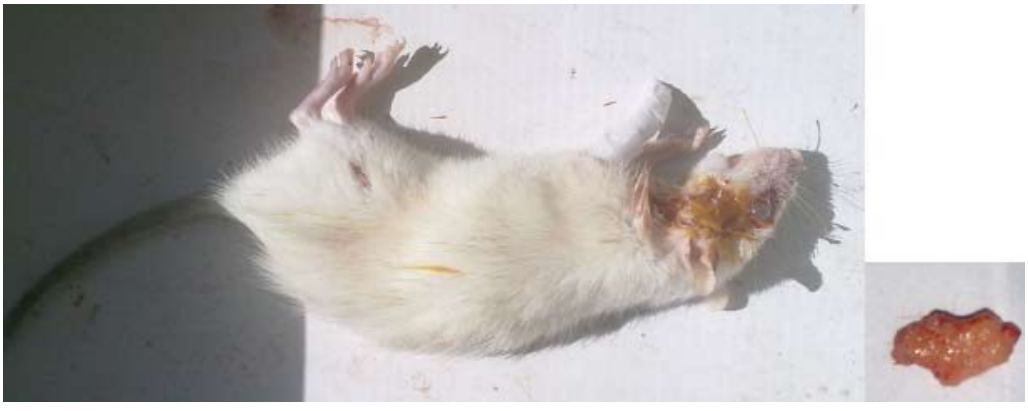

Figure 2. Showing initiation of nucleus division and end stage of nuclear division and also matured differentiating Fibroblast.

Anisocytosis and anisokaryosis were noticeable, and mitotic figures were infrequent (*Petterino et al., 2009*). Some of the round cells were present in the nucleolar remoulding stage and the presence of immature proliferating cells had previously been identified as spindle cell fibrosarcomas (*Ogino et al., 1986*). The primary tumour was characterized by fusiform spindle cells producing various amounts of interlacing bundles of collagen. The spindle-shaped cells contained moderate amounts of eosinophilic, fibrillar cytoplasm with an oval nucleus (Figure 3),

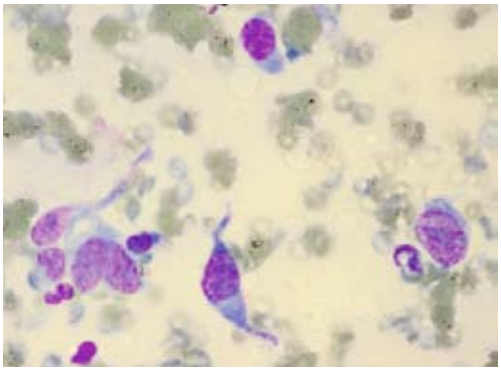

Figure 3. Area of the tumour showing spindle shaped malignant fibroblasts with pleomorphic bizarre nuclei, several of which show abnormal mitotic figures.

coarsely clumped chromatin, and one or more nucleoli. The cells formed a characteristic herringbone pattern and mitotic figures, and most were pleomorphic changing in to the fibroblast type (Figure 4).

These cells are arranged in short fascicles, which split and merge. From this observation we revealed that the tumorous mass was Fibrosarcoma.

In humans, fibrosarcoma is a rare malignant tumour of fibrous tissue most commonly found in middle-age adults and primarily occurring in the thighbone, upper arm, bone, or jaw; the tumour may also arise in soft tissues and organs. The mass is detectable by palpation before pain occurs. The tumour may invade surrounding tissues, which makes complete surgical excision difficult. It often recurs, and it

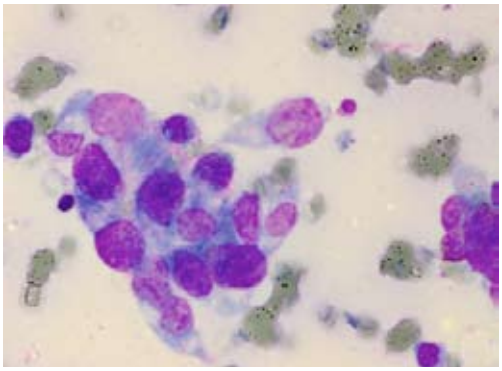

Figure 4. Showing bunch of matured differentiating Fibroblast & round cells.

may metastasize if the cells are large, have bizarre shapes, and are abundantly replicating. Tumours with cells that have a less unusual appearance have a much better prognosis.

Fibrosarcoma (fibroblastic sarcoma) is a malignant tumour derived from fibrous connective tissue and characterized by the presence of immature proliferating fibroblast or undifferentiated anaplastic spindle cells (*Jamesox et al., 1958; Stout, 1948*). It originates in the fibrous tissues of the bone and invades long or flat bones such as femur, tibia, and mandible. It also involves periosteum and overlying muscle. The tumour may invade surrounding tissues which makes complete surgical excixion difficult.

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