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RESEARCH ARTICLE

THE FIRST ROBOTIC ASSISTED MULTIDISCIPLINARY EXCISION OF NEUROGENIC TUMOR — A CASE REPORT

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ABSTRACT

Neurogenic tumors are an uncommon group of tumors. They can range from schwanomas, ganglioneuroma ganglioneuroblastomas and many more, covering the entire spectrum of benign to malignant. Surgery has been the mainstay of treatment. In this case report, we explore a case of ganglio neuroma that was treated with a multidisciplinary modality and robotic intervention.

INTRODUCTION

Neurogenic tumors are a rarely encountered type of tumor[1,2]. Ganglioneuromas are well encapsulated benign tumors which are seen in posterior mediastinum and retroperitonuem, generally in females and adolescents[3]. They arise from neural crest cells of the central and peripheral nervous system and are generally benign. These tumors often produce symptoms of compressive neuropathy when arising from the spinal cord. The most common manifestations were weakness of extremities, gait disorder and LBP with radiculopathy.[4] Ganglioneuromas are usually nonfunctional tumors with some percentage secreting catecholamines.[5] The mainstay of treatment is surgical excision [6]. In our case, we encountered a dumbbell shaped neurogenic tumor arising from the S2 nerve root with interspinous and intrapelvic extension. The pelvis is a cavity containing various anatomical structures.[7] The tumor was close to many vital nerves, vessels and organs of the pelvis. The complex anatomical structure of the pelvis along with its limited space, posed a challenge for conventional surgery and a multidisciplinary approach was taken. The dumbbell shaped tumor was disconnected and excised in parts. The pelvic dissection and subsequent excision of the intrapelvic part of the tumor was done by Dr. Udipta Ray followed by its dissection from the sacrum and spinal meninges by Dr. G R Vijay Kumar.

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Though Robotic assisted resection of neurogenic tumors have been previously reported, our multidisciplinary approach to surgery in this particular case, is, as of yet, the first of its kind.

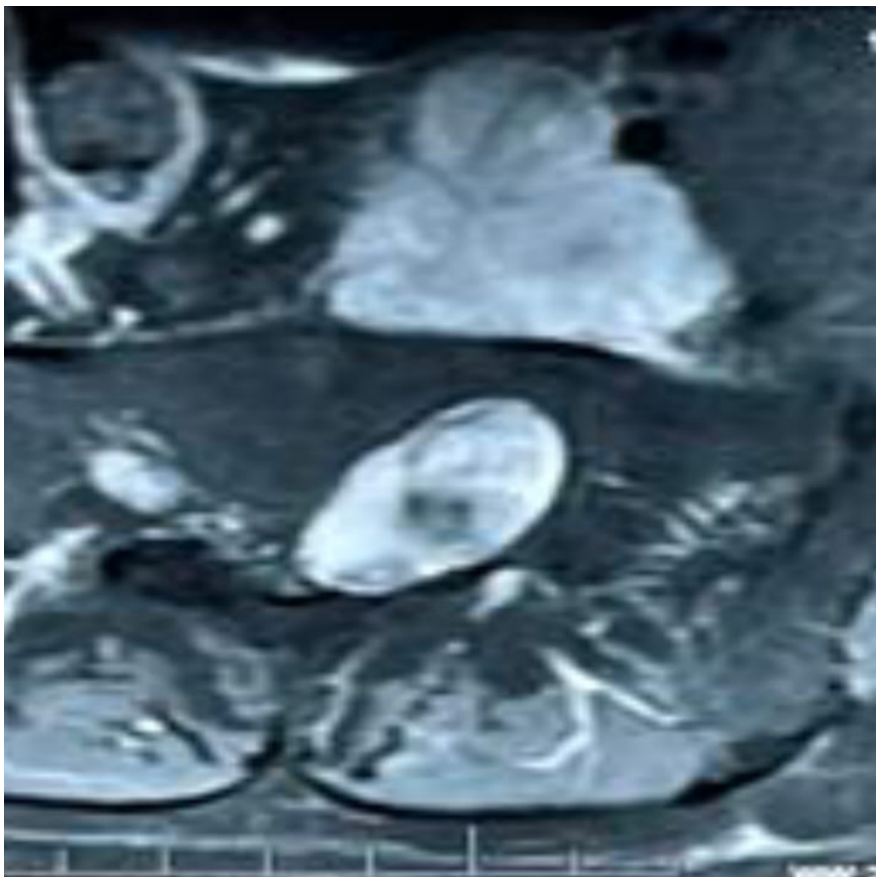
CASE REPORT

A 32 year, male patient presented to the OPD with a history of pain and burning sensation of the left leg from below the knee and involving the left foot since December 2022. The burning sensation developed over a period of time. He was conservatively managed with a diagnosis of neuropathy for one year after which he presented to Neurosurgery OPD at Fortis Hospital, Anandapur. MRI and CT scan showed a large dumbbell shaped tumor arising from the left neural foramen at S1-S2 level and extending into the pelvis causing widening of the left neural foramen at S1-2 level and partially encasing the left internal iliac vessels. No bony invasion was noted. Relevant preoperative investigations were done and the patient was posted for robotically assisted excision of the tumor by combined GI and Neurosurgery team. Excision of the pelvic mass in the presacral and left pararectal gutter was carried out following robotic dissection from the ureter, iliac vessels and rectum after mobilisation of the Sigmoid colon and rectum by the GI surgery team. The sacral foramina was identified and subsequently packed with AbGel. Average blood loss was less than 20 ml (2 gauze pieces). The neurogenic tumor was then excised from the spine and dura by the Neurosurgery team by a linear midline incision.

Midline durotomy was done under microscope and gently dissected from the arachnoid mater and fibrovascular tissue. The tumor was followed anteriorly into the sacral foramina and complete excision was ensured by visualisation of the AbGel pack. The tumor arising from S2 root was coagulated and cut.

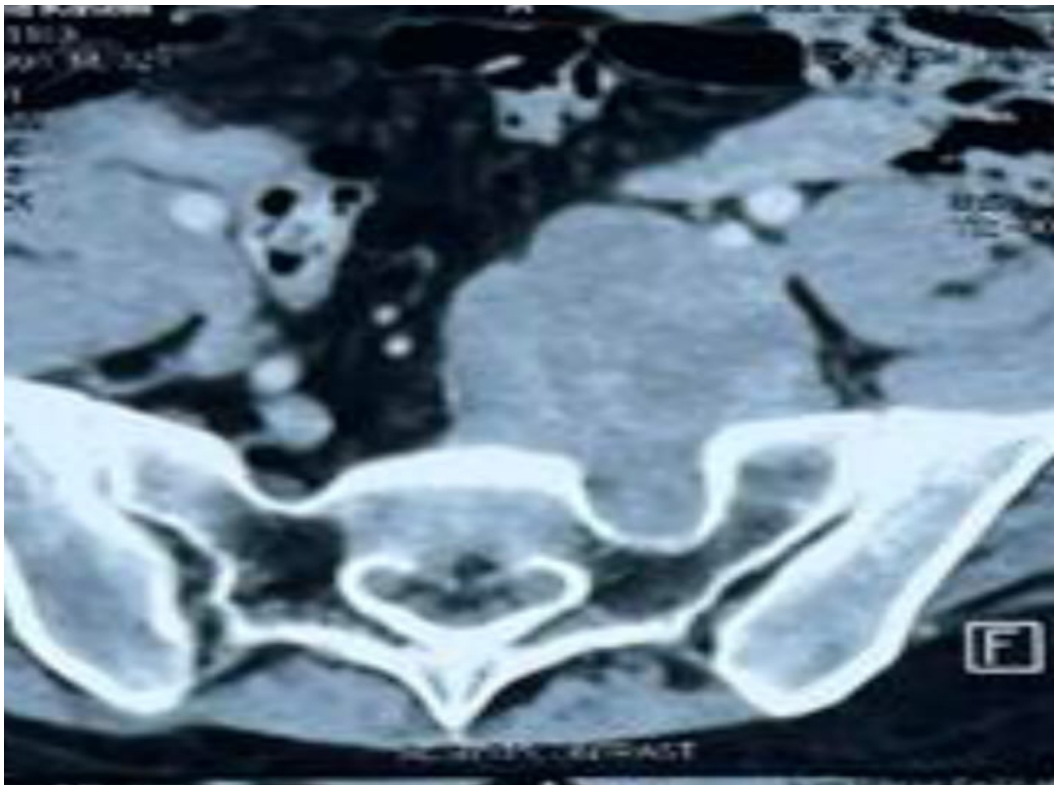
The patient was hemodynamically stable at discharge with his chief complains being resolved and had an uneventful recovery. The patient now has some impairment in his mobility at the ankle joint, most probably due to neuropraxia and is expected to have a full recovery with physiotherapy.

MRI SHOWING DUMBBELL SHAPED TUMOR

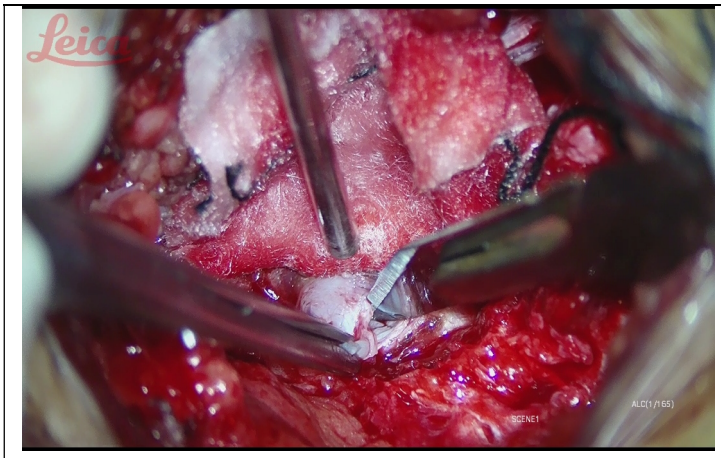


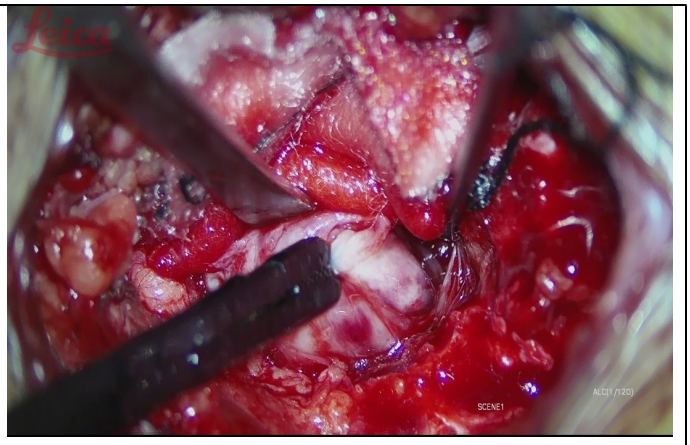
MRI SHOWING INTERSPINOUS EXTENSION OF TUMOR


MEDICAL SYSTEMS
AIR

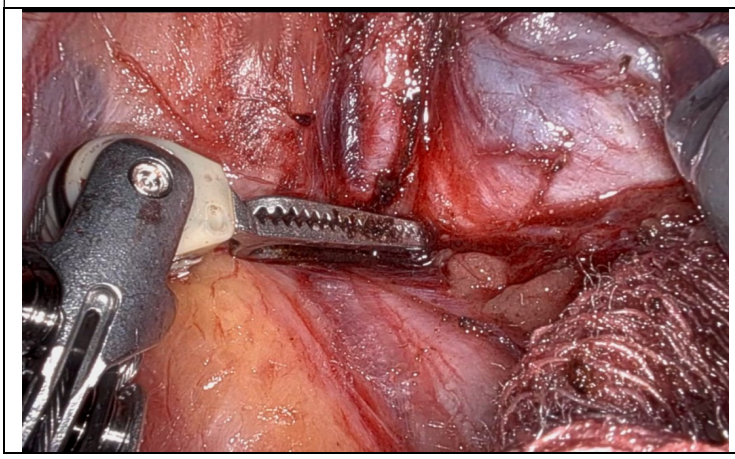


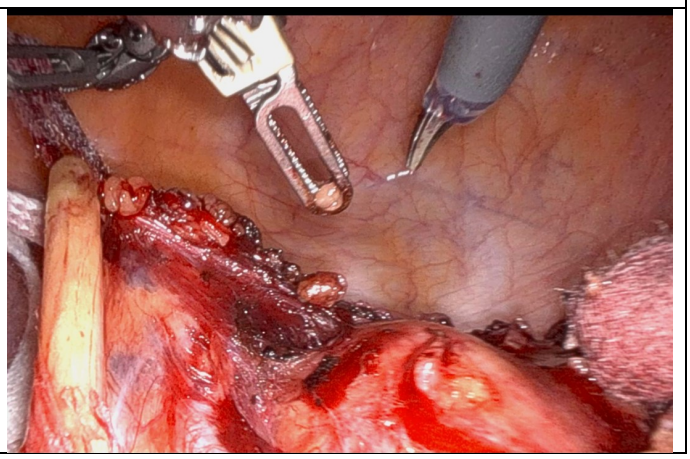
MRI SHOWING PELVIC EXTENSION



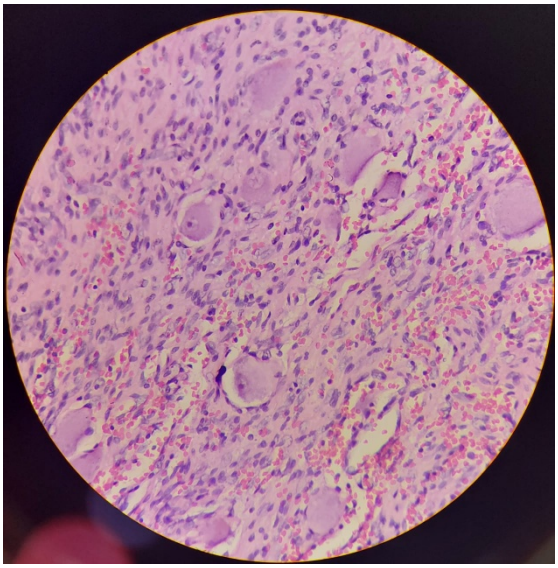


INTRAOPERATIVE MICROSCOPIC PICTURE SHOWING THE TUMOR POSTERIOR APPROACH





INTRAOPERATIVE PICTURE OF ROBOTIC DISSECTION OF PELVIC MASS



PICTOGRAPH SHOWING CLUSTERS OF GANGLION CELLS ON HPE

CONCLUSION

The pelvis provides significant challenge as a surgical field owing to its many vital contents, limited space and risk of torrential haemorrhage. However the manoeuvrability and versatility of robotic technique makes the process much easier. Though robotic management of sacral tumors have been reported before, ours is the first one managed by the collaboration of a Neurosurgical and Robotic team.

CONFLICT OF INTEREST: None

No Disclosure

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