Froin's Syndrome due to Spinal Paraganglioma - A Case Report

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Abstract

Yellow coloured, i.e. xanthochromic cerebrospinal fluid, with hypercoagulability and high protein content is pathognomic of Froin's syndrome. We present a case of Froin's syndrome in a patient with spinal paraganglioma.

A 55-year-old male patient presented with urinary hesitancy, numbness in lower limbs and difficulty in walking. During spinal anaesthesia, the anaesthetist noticed xanthochromic spinal fluid. Upon magnetic resonance imaging lumbosacral, an intradural focal lesion of abnormal signal intensity extending from T12-L1 vertebral level was seen. Laminectomy with excision of the mass was performed and a fleshy encapsulated mass was excised. Histopathology report showed the specimen to be a neoplastic lesion, and immuno-histochemical studies confirmed the mass to be a paraganglioma.

This case emphasizes that in case of Froin's syndrome, one should think of spinal cord tumours while evaluating the patient. A magnetic resonance imaging of the spine should also be done to look for spinal pathology along with other investigations.

Keywords: Cerebrospinal fluid, paraganglioma, spinal neoplasm, spinal cord tumor, magnetic resonance imaging.

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Introduction

Yellow coloured, i.e. xanthochromic cerebrospinal fluid (CSF), with hypercoagulability and high protein content is pathognomic of Froin's syndrome, a term first described by Georges Froin in 1903. Later in 1912, Raven described that the high protein content in the CSF was due to local compression of the cord resulting in dis-communication between CSF above and below the compression. Pial veins get congested and transudation of proteins occurs resulting in increased protein content in the CSF[1,2]. Previous work has shown Froin's syndrome to be associated with different tumours of the spinal cord, spine and diseases of the meninges[1,3,4], but hasn't been found to be associated with spinal paraganglioma. Paragangliomas are neoplastic transformation of paraganglia. Spinal paragangliomas are rare tumours and present as intradural mass involving cauda equina and filum terminale. They may be hereditary or spontaneous; spontaneous being more common. Paragangliomas may arise as a part of hereditary syndrome. Spontaneous paragangliomas occur commonly during the third to fifth decade of life. Paragangliomas may be parasympathetic or sympathetic. Sympathetic paragangliomas are mostly functional and secrete catecholamines, and are located mostly

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in the adrenal medulla. Para sympathetic paragangliomas are usually located in the carotid body or jugular foramen and are mostly non-functional. Histologically, they have a characteristic "Zellballen" pattern, and on immuno histochemical analysis, are positive for chromogranin A and synaptophysin[5,6].

Here we present a case of Froin's syndrome in a patient diagnosed with spinal paraganglioma.

Case Report

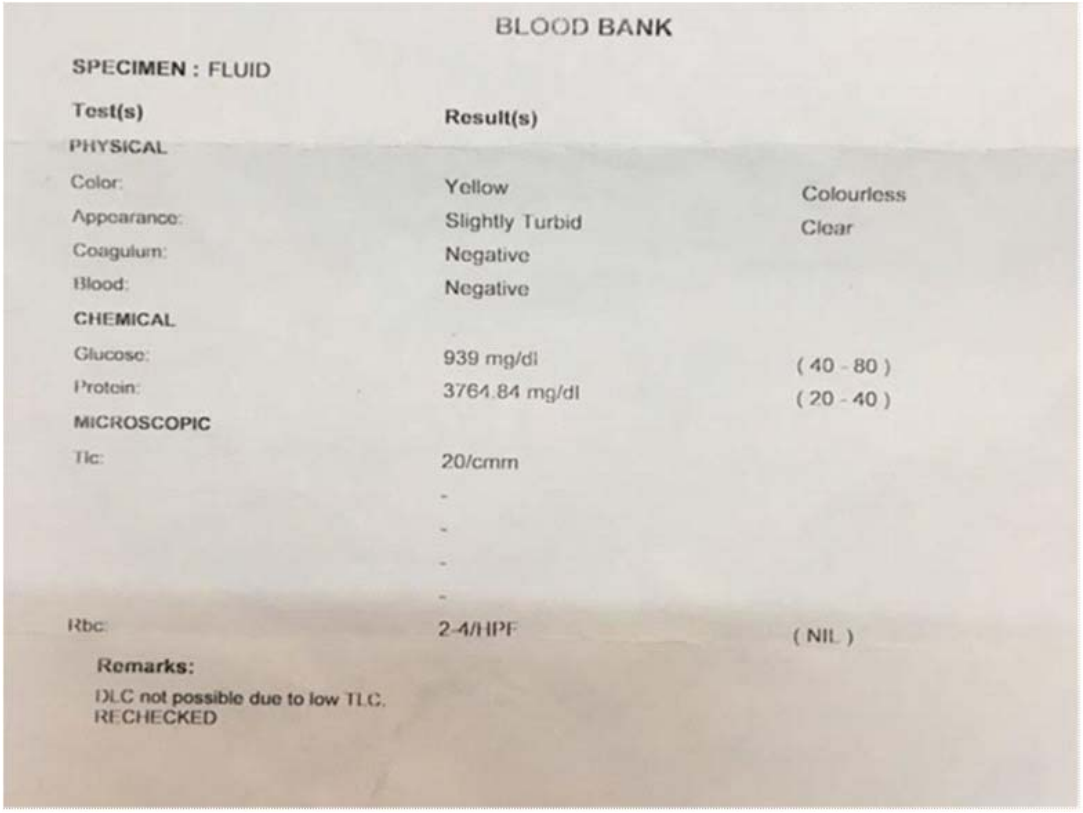
We present a case of a 55-year-old male patient who presented in the Urology outpatient department of Abbasi Shaheed Hospital, with complains of urinary hesitancy for 3 years and he had developed urinary retention with overflow for the last 2 months. He also complained of numbness in both lower limbs, along with difficulty in walking since 2 months. Numbness was gradual in onset, progressive in nature, initially involving the right leg but later on progressed to involve both legs. It was continuous and had no relieving or aggravating factors. Walking difficulty was moderate as he was able to walk with support and was able to carry out his daily routine activities.

He was initially catheterized for urinary retention and overflow. Ultrasound kidney, ureter and bladder (US KUB) did not reveal any obstruction or other pathology. Therefore a cystoscopy was planned under spinal anaesthesia. The patient was verbally informed and a written consent was taken for the procedure. During spinal anaesthesia for cystoscopy, the anaesthetist noticed yellow coloured cerebrospinal fluid (CSF) and he abandoned the procedure, hence cystoscopy could not be performed. His CSF was sent for fluid detailed report (DR), which showed that the fluid was xanthochromic, turbid, having raised glucose level (939 mg/dL) and very high protein (3764mg/dL) content (Fig. 1). He was then referred to the Department of Neurosurgery for further evaluation.

On presentation to neurosurgery, motor examination of lower limbs showed decreased tone and bulk, diminished reflexes, reduced power (4/5) and muted planters, while upper limb motor examination was unremarkable. Sensory examination revealed decreased sensation at the level of L5 and sacral region and upper limb sensory examination was normal. He was advised a magnetic resonance imaging (MRI) scan of the lumbosacral region. MRI findings showed a focal lesion of abnormal signal intensity that was involving the terminal spinal cord extending from the T12-L1 vertebral levels. The mass was intradural in nature and was hyperintense on T2 weighted images and iso- to hypointense on T1 weighted images (Fig. 2).The post contrast examination showed intense homogenous enhancement of the lesion. The MRI findings were suggestive of ependymoma or neurofibroma. On this basis, laminectomy with excision of the mass was planned.

Laminectomy was performed under general anaesthesia and a fleshy encapsulated mass of about 5x5 cm was excised and sent for histopathology. There were no intra-operative complications and patient had uneventful surgery, he was then shifted to ward and was discharged from there.

During his stay in the hospital patient had no complication. After the surgery, patient's complains of numbness, pain and difficulty in walking, all subsided. His motor and sensory examination were normal after surgery with no motor or sensory deficits. Histopathology report showed that the specimen was composed of stellate to columnar cells readily arranged around the blood vessels. The nuclei were round to oval, fairly bland looking with no significant mitotic activity. Elongated cytoplasmic processes were present around the blood vessels. Focal myxoid change in the stroma was also present. Immuno histochemical studies showed the tumour cells reactivity to Synaptophysin, s100, Cytokeratin AE1/AE3 and



BLOOD BANK

SPECIMEN : FLUID

Test(s)	Result(s)	
PHYSICAL		
Color:	Yellow	Colourless
Appearance:	Slightly Turbid	Clear
Coagulum:	Negative	
Blood:	Negative	
CHEMICAL		
Glucose:	939 mg/dl	(40 - 80)
Protein:	3764.84 mg/dl	(20 - 40)
MICROSCOPIC		
Tlc:	20/cmm	
	-	
	-	
	-	
	-	
Rbc:	2-4/HPF	(NIL)

Remarks:

DLC not possible due to low TLC.
RECHECKED

Fig. 1. CSF detailed report of the patient showing increased protein and glucose along with xanthochromia

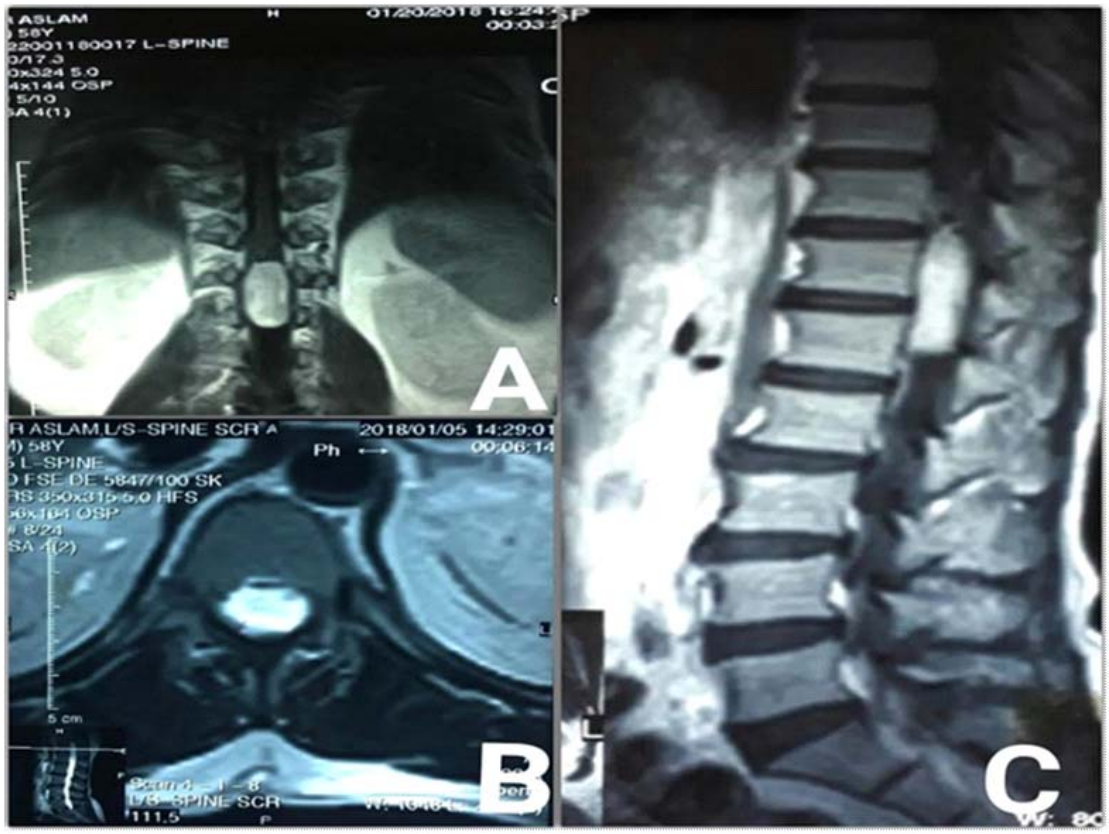


Fig. 2. MRI lumbosacral showing a hyperintense area on T2 weighted images extending from T12-L1 as shown in Coronal (A) and Sagittal planes (C), and Transverse (B) plane

was non-reactive to Chromogranin-A, Epithelial membrane antigen (EMA), Glial fibrillary acidic protein (GFAP). These findings confirmed that the mass was a paraganglioma.

On follow-up the patient had no complains of numbness or pain or difficulty in walking. MRI lumbosacral was done again to look for any remaining mass or other abnormality but the MRI was unremarkable. He still had urinary retention and overflow for which he was referred back to the urology department and he was catheterised for his complain.

The patient was verbally informed and written informed consent was also taken from him about his case being used as a case report. This case was seen and treated at Department of Neurosurgery at Abbasi Shaheed Hospital Karachi. No funding was used and there are no conflict of interests.

Discussion

The presence of xanthochromia, high protein content and hypercoagulability of CSF is characteristic of Froin's syndrome, the term first described by George Froin in 1903 and thus named after him[1]. Froin's syndrome has been found associated with tumors of spinal cord, tumor of spine and meningitis[1,3,4]. Association of these conditions with Froin's syndrome has lead the researchers to suggest that communication of spinal fluid, if blocked from above by the tumor, adhesions of meninges or bone disease, then the subarachnoid space below the tumor behaves as cul-de-sac, also pial veins get dilated which leads to transudation of protein and fibrinogen which results in high protein count and hypercoagulability of the spinal fluid[1,2]. Our case also endorse this theory. In our case we found Froin's syndrome associated with spinal paraganglioma, which was found to be causing compression of the cord that can be appreciated on MRI (Fig. 2) and thus causing stagnation of the CSF resulting in Froin's syndrome.

Paraganglioma's are the neoplastic transformation of paraganglia, which are neural crest cells derived non-neural cells. Paraganglioma's can be secretory secreting catecholamines, and patients presenting with hypertension, tachycardia or diaphoresis which weren't present in our case so we excluded functional or malignant paragangliomas[5] and we didn't go for catecholamines levels or other investigations in that direction. On the basis of location they can also present with mass effect like numbness, pain or weakness[6-8]. Our patient's MRI lumbosacral had also revealed a lesion extending from T12-L1 levels, so we thought that patient's symptoms of numbness, pain and weakness were due to that mass. Radiologically they appear hyperintense on T2 weighted images and iso or hypointense on T1 images of MRI[6,7,8]. These findings are consistent with MRI findings of our case which also showed a hyperintense area on T2 weighted images and hypointense on T1 weighted images.

Paragangliomas have been treated successfully with complete surgical resection and adjuvant therapy has been restricted to malignant forms only[9,10]. Complete surgical resection was used as the mode of treatment in our case, and has been found effective as the patient was symptom free after the operation and was found symptom free on follow-ups as well. As their prognosis is excellent they should be differentiated from other spinal tumors and in case of malignant forms or recurrent tumors neoadjuvant therapy should be implicated[8] and follow up imaging and radiological assessment is also required.

Conclusion

Our case stresses that in cases with Froin's syndrome, spinal pathologies should always be considered as a cause. Spinal imaging should be performed in these patients along with other radiological investigations. Complete surgical resection of the paragan-

glioma can be used alone as treatment in non-malignant cases.

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ANSWER OF PICTURE QUIZ: Keratoconus