



Association of Physicians of India
Delhi State Chapter

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FRIEND TURNED FOE

PRESENTER - DR.PRABHAT KR SINGH

ABVIMS AND DR RML HOSPITAL

DEMOGRAPHY AND CHIEF COMPLAINS

- A 34 year old gentleman, diagnosed case of Axial Spondyloarthritis -not compliant to medication and post bilateral total hip replacement
- Resident of Delhi
- Chief complaints-

Difficulty in walking for one year

Dyspnea on exertion for four months

Altered sleep pattern for one month



HISTORY OF PRESENTING ILLNESS

- Patient was apparently doing well before one year, when he started having difficulty in walking due to pain. It was located at left hip, insidious in onset, gradually progressive and non radiating.
- Patient was unable to walk in straight line without support with body swaying to left side.

CONT.....

- Pain was associated with numbness and tingling sensation in both lower limbs. It was also insidious in onset and gradually progressed till knee. He was not sure about his temperature sense of lower limbs. On further enquiring he told that his slipper also slipped out.
- Patient had dyspnea on exertion for 4 months. It increased on exertion and relieved by rest. It progressed from NYHA grade I to grade 3 over 4 months.
- It was associated with swelling of lower limbs, which was limited till ankle.

CONT.....

- Patient also complaint of decreased sleep duration and loss of interest in interaction with family members including his wife and child for last 1 month.

PAST HISTORY

- Patient was diagnosed case of Axial Spondyloarthritis for 20yrs of his age
- He stopped all the medication for 3 years as he had no symptoms
- Patient had undergone both hip replacement surgery right side(2009) and left side (2011) in a private hospital of Delhi
- No other significant past history



CASE SUMMARY

34 years, old male a known case of Axial Spondyloarthritis with bilateral total hip replacement, came to us with Difficulty in walking for 1 year, Dyspnea on exertion for 4 months, Altered sleep pattern for 1 month

CLINICAL DIAGNOSIS

Axial Spondyloarthritis with Total hip replacement with ?Congestive heart failure with ?Polyneuropathy



GENERAL PHYSICAL EXAMINATION

- Patient conscious and oriented to time place and person
- Afebrile to touch
- Temperature- 98.9F in oral cavity
- BP-126/70 mm hg in right arm, supine position
- PR-110/min, regular, high volume, no radioradial or radiofemoral delay, all other peripheral pulses palpable.
- RR-20/min regular abdominothoracic

CONT....

- Pallor present
- Pedal edema present till lower shin of tibia
- No icterus /cyanosis/clubbing
- JVP not raised
- No thyroid swelling palpable
- No skin rashes
- BMI - 22.8 Kg/m²

SYSTEMIC EXAMINATION

CENTRAL NERVOUS SYSTEM

Conscious and oriented to time place and person

Orientation, memory, speech, reading, writing all intact (MMSE-30)

Neck rigidity, Kernig's and brudzinski - Absent

Cranial nerve examination - all wnl

MOTOR EXAMINATION –

1. Appearance - normally flexed as in natural resting position
2. Bulk - normal for his age group and gender

	Rt. (cm)	Lt. (cm)
Arm	32	32
Forearm	24	24
Thigh	54	54
leg	33	33

3. Tone - normal in all 4 limbs
4. Power -

Shoulder	Right	Left
Abduction	5/5	5/5
Adduction	5/5	5/5
Flexion	5/5	5/5
Extension	5/5	5/5
Internal rotation	5/5	5/5
External rotation	5/5	5/5
Elbow		
Flexion	5/5	5/5
Extension	5/5	5/5
Wrist		
Palmar flexion	5/5	5/5
Dorsal flexion	5/5	5/5
Finger grip	Normal	Normal

Hip	Right	Left (ROM – Present)
Abduction	5/5	
Adduction	5/5	
Flexion	5/5	
Extension	5/5	
Interal rotation	5/5	
External rotation	5/5	
Knee joint		
Flexion	5/5	5/5
Extension	5/5	5/5
Ankle		
Plantar flexion	4/5	4/5
Dorsiflexion	4/5	4 /5

REFLEXES

❖ Bilateral plantar- Flexor

❖ Hoffman negative

DTR		
Biceps jerk	+	+
Triceps jerk	+	+
Supinator jerk	+	+
Knee jerk	+	+
Ankle jerk	+	+
Clonus at ankle and patella	-	-

❖ Abdominal reflexes Present

SENSORY SYSTEM-

1. Superficial

Temperature (both hot and cold) and touch - **impaired till knee**. Normal elsewhere

2. Deep

Vibration, Position sense, Joint sense - Normal

3. Cortical

One point localisation, Two point discrimination, Stereognosis - Normal



RESPIRATORY SYSTEM –

- ❖ Bilateral symmetrical movement of chest
- ❖ Bilateral fine basal crepts present in infrascapular and infraaxillary

CARDIO VASCULAR SYSTEM –

- ❖ Apex beat – normal in position but Hyperdynamic
- ❖ S1 loud ,S2 – normal A2P2, S3 heard

PER ABDOMEN EXAMINATION–

- ❖ Soft , no hepatosplenomegaly

CASE SUMMARY

34 years, old male a known case of Axial Spondyloarthritis with bilateral total hip replacement, came to us with Difficulty in walking for 1 year, Dyspnea on exertion for 4 months, Altered sleep pattern for 1 month

- With Tachycardia, Pallor, Pedal edema, Hyperdynamic circulatory state With bilateral basal fine crepitations on respiratory examination.
- With sensory motor deficit in lower limb



DIFFERENTIAL DIAGNOSIS

- Axial Spondyloarthritis with Total hip replacement with ? Misaligned left hip implant with ?Left ventricular heart failure secondary to Anemia with ?Polyneuropathy
- ? NSAID induced AKI vs CKD
- Malabsorption

On the basis of history and clinical examination patient was managed empirically with diuretics, Analgesics and antacid



LABORATORY INVESTIGATIONS

COMPLETE BLOOD COUNT	On Date of admission	
Hb	4.4	
PLATELET	2.5 L	
TLC	4600	
P/L/E/M/B	75/24/2/3	
MCV	70	
PCV	15	
PS	microcytic hypochromic anemia	
Retic count	0.2%	

LABORATORY INVESTIGATIONS

LAB INVESTIGATION	On date of Admission
UREA/CREATININE	23/0.6
URIC ACID	2.8
Total bil/direct bilirubin	0.67/0.21
AST/ALT	40/50
ALP	69
Na/k	138/4.04
Total protein/albumin	4.3/2.6
Ca	7.8

LABORATORY INVESTIGATION

Cardiac Profile	On day of examination
CK	41
CKMB	11
LDH	183

FURTHER INVESTIGATIONS DONE

- **Anemia work up**

Iron profile – Iron 13, UIBC 294, TIBC-497 and saturation-4.7%.

Serum ferritin- 13 mg/dl

Serum Vit B12 – 550 pg/ml

Serum folate – 30 ng/ml

Viral marker – non reactive

Mantoux test – no reaction

FURTHER INVESTIGATIONS DONE FOR IDA

- USG and CECT Abdomen - NAD
- Upper GI endoscopy - NAD
- Anti TTG - 0.6 (which was in normal reference range)
- Bone marrow biopsy showed decreased iron stain
- 2D Echo - normal chamber dimensions and ejection fraction of 55%.

WORKUP FOR POLYNEUROPATHY

NEURO-ELECTROPHYSIOLOGY LAB DEPARTMENT OF NEUROLOGY Dr. RML HOSPITAL NEW DELHI-110001

ID : 291/22

PATIENT NAME : VISHAL

Age/Sex : 37 YRS/Male

Examination Date: 08 March 2022

REFERRED BY : DR M P S CHAWLA

Examiner: Ms SUNITA/Ms M KHURANA

Motor CV

Test	Stimulation site	Lat., ms	Ampl., mV	Dur., ms	Area, mV x ms	Stim., mA	Stim., ms	Dist., mm	Time, ms	Vel., m/s
R. Peroneal										
1	Ankle	3.6	0.6	18.0	2.8	100	0.2			
	Head of fibula	11.7	0.6	18.2	2.7	100	0.2	380	8.15	46.6
L. Peroneal										
7	Head of fibula		0			100	0.2			
R. Tibial										
3	Ankle	4.9	3.0	13.7	8.5	100	0.2			
	Popliteal fossa	15.1	2.3	17.3	7.5	100	0.2	380	10.2	37.3
L. Tibial										
5	Popliteal fossa		0			100	0.2			

Sensory CV

Test	Site	Lat., ms	Ampl., μ V	Dur., ms	Area, nV x s	Stim., mA	Stim., ms	Dist., mm	Time, ms	Vel., m/s
R. Sural										
9	Lateral Malleolus		0			25	0.1			
L. Sural										
10	Lateral Malleolus		0			25	0.1			

F-Wave Findings

Test	Fmin lat., ms	M lat., ms	Fmin-M lat., ms	Max Vprox, m/s
R. Tibial				
4	54.9	4.1	50.8	

NCV FINDINGS :

MNCV : No response attained from Lt Peroneal & Tibial nerves. Low amplitude with normal distal latency, & NC Velocity attained from Rt Peroneal & Tibial nerves.

SNCV : No response attained from all the nerves tested.

F-WAVE : No F-latency attained from b/l Peroneal & Lt Tibial nerves. Normal F-latency attained from rt Tibial nerve

IMPRESSION : Acquired sensory motor polyneuropathy of both lower limb predominantly of axonal type

Please correlate clinically.

MS

INPUT TILL NOW

Iron deficiency Anemia

Polyneuropathy

Psychiatry manifestation

Patient was planned for toxic metal screening

COBALT TOXICITY

- ❖ Serum cobalt - 6.34microg/L (Reference- less than 1.8 microg/L)
- ❖ Urine Cobalt levels - 29.92microg/L (Reference – 6.4 microg/L)

SOURCE?

X-ray pelvis showed misaligned left hip implant with osteopenia.

Orthopedic surgeon posted the patient for hip implant replacement and reconstruction.
Intra operative finding showing extensive wear and tear of left hip implant and deposition of metals in the soft tissue around the joint



POST OPERATIVE DAY 28

2 UNIT BT WAS DONE TO BUILD THE HB TILL 7

COMPLETE BLOOD COUNT	On Date of admission	Post op
Hb	4.4	10.5
PLATELET	2.5 L	2.5 L
TLC	4600	5600
P/L/E/M/B	75/24/2/3	72/27/2/3
MCV	70	84
PCV	15	33
PS	microcytic hypochromic anemia	Normocytic normochromic
Retic count	0.2%	5

POST OPERATIVE DAY 28

Iron profile	On day of Admission	Post op
Iron	13	102,
UIBC	294	161
TIBC	497	263
Saturation	4.7	39

FINAL DIAGNOSIS

- Axial Spondyloarthritis with Total hip replacement with Misaligned left hip implant with Cobalt toxicity leading to Anemia with Polyneuropathy with psychiatric manifestation

DISCUSSION

- Cobalt is a Divalent metal ion, present in trace amount in serum
- Cobalt absorption is through GI tract by Divalent metal transporter in duodenum, Inhalation, and through skin
- Metal-on-metal hip implants pose threat of wear and tear leading to dissemination of metallic ions around soft tissue and then after into the blood stream leading to systemic manifestation.

CONT...

- Prosthetic hip associated cobalt toxicity has been seen with various systemic manifestation commonly being neurological symptoms such as polyneuropathy, optic nerve atrophy, and sensorineural hearing loss.
- Mechanism which has proposed is disruption of mitochondrial oxidative phosphorylation, neurotransmitter modulation, and direct neuron cytotoxicity

CONT...

- Other systemic manifestations include hypothyroidism
- Cardiomyopathy leading to complications like Atrial Fibrillation and Flutter
- Psychiatric manifestation like depression
- Constitutional symptoms fever, irritability, anorexia, fatigue and weight loss
- There was no clear correlation seen between serum cobalt levels and their clinical presentation.

CONT...

- Most common presentation being neurological symptoms and mean duration of signs and symptoms appearance between 3 to 72 months after arthroplasty. But clinical guidelines are yet to be defined leading to inadequate clinical decision
- In the natural course of the disease, thyroid dysfunction, sensorineural deafness, vertigo and cardiomyopathy improved with improvement in ejection fraction once cobalt levels became $<5\text{microg/L}$ after removal of default implant
- Polyneuropathy and optic nerve atrophy didn't show signs of recovering.

CONT...

- In Hematological manifestation, patient with cobalt toxicity by oral intake of cobalt chloride tablets is transiently seen with polycythaemia caused by increased levels of hypoxic inducible factor 1-alpha.
- Once iron stores are exhausted then it leads to Iron deficiency anemia.
- Patients with Iron deficiency anemia showed increased mean urinary cobalt levels

CONT...

- Effect on cobalt on bone was shown to be at the level of osteoclast.
- Osteoclasts were easily stimulated even at lower toxic serum levels of cobalt leading to brittle bone and ease fractures
- Divalent metal ion receptor present in duodenum helping in absorption of various divalent metals like iron, zinc, cobalt, lead and chromium are downregulated in presence of high cobalt levels leading decreased absorption of various divalent metal ions

LEARNING POINT

- Metal on metal implants due to wear-tear phenomenon tend to release the metals causing its toxicity. Most commonly seen with metals like cobalt, chromium and so on.
- The metallic causing deposition in surrounding muscle and then enter the systemic circulation causing the effects.
- Cobalt Metallosis usually has clinical features of cardiomyopathy, polyneuropathy, bilateral optic neuropathy, bilateral sensorineural hearing loss, thyroid disorders and polycythaemia

THANKS