Case Report

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Child with Multiple Organ Dysfunction

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Abstract

Daughter of Mr. Natwar Lal named "X", 16 years old child came to AIIMS OPD Jodhpur with complaints of increasing oedema, increasing BP, uncontrolled sugar and fever and dry cough since 3 days. She was diagnosed with IDDM, Solitary kidney, Diabetic nephropathy, Hypertension grade II and Hypothyroidism and was sent home with prescription. But 2 months later the child came with fresh complaints: which were ear pain, ear discharge for 10 days, swelling over right side of face for 4 days, pain over right shoulder for 4 days, unable to take orally for 3-4 days, and fever. She was additionally diagnosed with ASOM with complications. She has undergone mastoidectomy. Her solitary kidney and IDDM made her to develop super added infections. That led to multiple organ failure like chronic renal failure, respiratory failure, cerebral atrophy and liver dysfunction. She lost her consciousness due to brain involvement and respiratory involvement. The prognosis seems to be poor as multiple organs have got damaged, even though the child is provided with meticulous treatment in PICU.

Keywords: IDDM; Solitary Kidney; Diabetic Nephropathy; Hypertension Grade II; Hypothyroidism; Acute Suppurative Otitis Media; Periorbital Cellulitis; Vocal Cord Palsy; Pneumonia; Pleural Effusion; and Respiratory Failure.

History

Daughter of Mr. Natwar Lal named "X", 16 years old child, a known case of IDDM from 6 years of age came to AIIMS Jodhpur OPD on 12/02/2016 with the complaints of increasing oedema, increasing BP, uncontrolled sugar and fever and dry cough for 3 days. She undergone urine test, complete blood test , thyroid test, and blood culture. Later she was diagnosed to have IDDM, diabetic nephropathy, hypertension, with hypothyroidism. The paediatrician prescribed her Tab Telmesontan 40mg, Tab Dyton 30mg, Tab Zystarix 2.5mg, Tab Amlogard 10mg, Tab Calpol 500mg, Tab Augmentin 625mg, SypAsthalin 2 tsb, and Tab Monteklc and she was sent to home. After two months (04/05/2016) she came with the complaints of ear pain, ear discharge for 10 days, swelling over right face for 4 days pain at right shoulder for 4 days, not able to take orally for 3-4 days, and fever. The child was admitted in pediatric ward on same day. Various investigation like RFT, ear swab, urine test, USG of neck and face, pelvic 'X' ray, CT of face and neck as advised by ENT consultant and ophthalmologist consultation revealed that with previous diagnosis additionally at present she also suffering with ASOM, preseptal cellulitis and orbital cellulitis. After diagnosis she was shifted to PICU on 5/5/2016.

The family history revealed that Mr.Natwar Lal is suffering with IDDM and hypertension. But no family history of solitary kidney disease or other congenital anomaly.

Findings of Physical Exmination, Lab and Radialogical Investication

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General Condition

Unconscious for past 3 weeks to till date, GCS score is 3, short statue.

Vitals:

Temp: Fluctuating due to sepsis. CRP elevated.

Reps: under mechanical ventilator

Pulse: Increased

BP: uncontrolled

Anthropometry:

Weight: 34 kg

Height: 145 cm

Skin: pale yellow facial swelling, HB is 4.5gm. Oedema and swelling.

Head: 19/05/2016 CT head revealed large acute infarct in the right tempoperital region with right haemorrhagic transformation, thrombus in right M2 MCA, cerebral atrophy, and bilateral maxillary, ethmoidal, sphenoidal and right frontal sinusitis. Bilateral mastoiditis.

Oedema and Fluid in mastoid found as per Radiological report.

Eyes: orbital swelling. Pupils are constricted. No reflex response.

Ears: swelling and ear discharge present. Dressing done daily under asepsis.

Nose: epistaxis was present and Vitamin K given.

Mouth: secretion was there. Suctioning done as needed.

Face and Neck: 11/05/2016 *MRI neck* revealed Oedematous changes in larynx with partial effacement of pre epiglottic and right paraglottic space. The right parotid and submandibular gland and thyroid gland also appears oedematous. *Ultrasound of neck and face* on 05/05/2016 revealed thickening of skin and subcutaneous tissue in the right side of the face and neck. Sub centric cervical lymphadenopathy is seen on right side.

On assessment facial puffiness was observed.

Tracheostomy tube is placed and connected with mechanical ventilator.

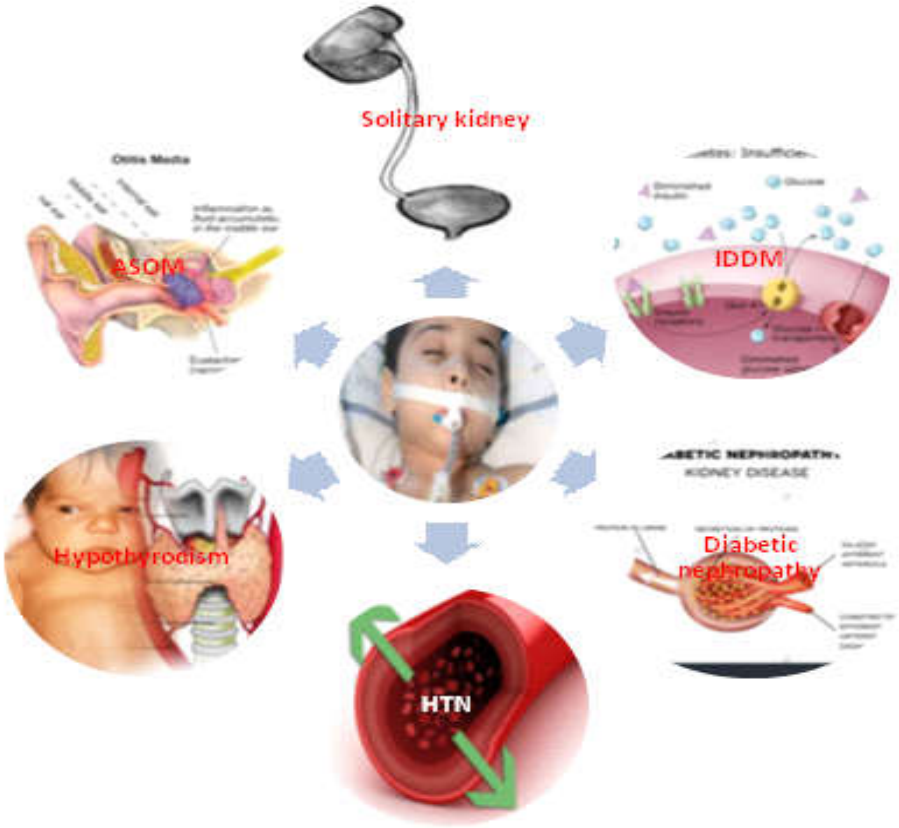
Jugular vein used for central line.

Thyroid gland and lymph node is palpable.

Chest: ABG revealed respiratory acidosis. CT revealed Vocal cord palsy. Child is connected with mechanical ventilator. SIMV mode. Respiratory failure.

Abdomen: under NG feed. Bilirubin levels are elevated. Liver is palpable. Elevated liver enzymes.

Extremity: Pedal enema present, no reflex response.



Spine and CNS: CT revealed cerebral atrophy, no reflex response. Not conscious.

Genitourinary: urine out was decreased, urea and creatinine levels are increased. GFR was decreased. Ultrasound revealed single kidney at right side. Primary amenorrhea.

Fluid and Electrolytes: sodium and potassium are elevate and Calcium decreased urea and creatinine elevated. Bilirubin level raised.

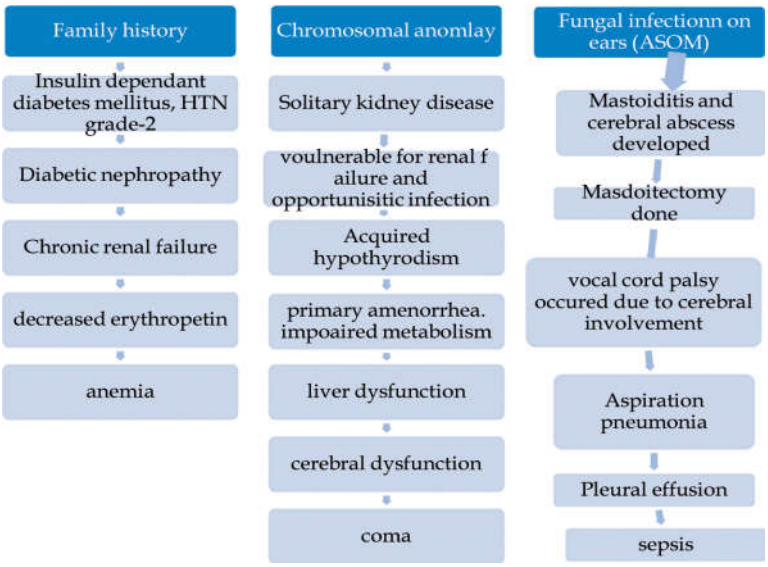
Actual Diagnosis

1. IDDM,
2. Solitary kidney
3. Diabetic nephropathy,
4. Hypertension grade II
5. Hypothyroidism
6. ASOM
7. Pre-septal and periorbital cellulitis.

Disease Consition and Treatment

Diseases	Condition and treatment
IDDM: Child's pancreas no longer produces the insulin leads to increased blood glucose. The causes in unknown. Family history and genetic **susceptibility is risk factor.**Manifested with Increased thirst and frequent urination. Extreme hunger. Weight loss. Fatigue. Irritability or unusual behavior. Blurred vision and Yeast infection. Complications are Heart and blood vessel disease, Nerve damage neuropathy. Nephropathy, Eye damage. Foot damage, and Osteoporosis. Diagnosis is **Random blood sugar test.Glycated haemoglobin (A1C) test. Management** is a lifelong commitment of blood sugar monitoring, insulin, healthy eating and regular exercise.	Blood sugar is not controlled. Last blood sugar was 138mg/dl. Weight loss was observed. Initially given regular insulin IV 40 unit with 40ml NS at 0.8ml/hr. Later shifter to SC 5 unit 6 hourly. Diabetic nephropathy was developed.
Diabetic nephropathy: It is a damage to kidneyscaused by diabetes. In severe cases it can lead to kidney failure. Risk factors are hypertension, hyperlipidaemia. There are no symptoms in the early stages. Swelling in body especially feet and legs.is early sign of kidney damage. Presence of albumin in the urine indicates kidney damage. Treatment is controlling BP and blood sugar.	History of diabetic nephropathy for past 2 years. Caused by uncontrolled blood sugar. She developed chronic renal failure as a complication of diabetic nephropathy Electrolyte imbalance is seen. BUN elevated creatinine levels are elevated. Catheterised for elimination Inj Heparin 2500 IU.
Hypertension grade II: Stage 2 hypertension – Systolic and/or diastolic blood pressure ≥99th percentile plus 5 mmHg. It often develops during childhood and adolescence. Manifested with headache, vomiting, seizures, or heart failure. When the blood pressure is at or greater than the 99th percentile on three separate measurements indicates HTN. Management includes Lifestyle changes (Weight loss, Regular exercise and Dietary changes) and antihypertensive drugs (thiazide diuretics, angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs), calcium channel blockers, and beta blockers.)	BP is poorly controlled (134/100 mmhg). Caused by renal failure She is under multiple Anti HTN drugs. Like amlyodipin 10 mg BD, Metalozone 2.5mg OD. Injlasix 40mg with 10 ml D5 ovr one hr.
Acquired Hypothyroidism: Caused by autoimmune thyroiditis (Hashimoto thyroiditis) and occurs during later childhood and adolescence. Manifested with weight gain; fatigue; constipation; coarse, dry hair; sallow, cool, or mottled coarse skin. Growth retardation, delayed skeletal maturation, and usually delayed puberty. Thyroid function test, and thyroid ultrasonography or radionuclide scan are diagnostic stools. Treated with Thyroid hormone replacement.	T3 and T4 levels are reduced. Primary amenorrhea is present. On thyroxine 50 ug OD
ASOM: Inflammation of mucosal membrane of the middle year caused by pus forming organism. Manifested with pain the ear, hearing difficulty, giddiness. Congestion and bulging of ear drum. Leads to ear discharge and perforation. Treated with steam inhalation, and antipyretic, antibiotic antifungal agent based on organism caused. Myringotomy is the surgical management. Complications are mastoiditis, and hearing loss.	Caused by Zygomycetes (fungal infection) Mastoiditis developed as a complication. Right cortical Mastoidectomy was done on 10/05/2016 Multiple antibiotic and antifundal was given like. Amphoterecin-B 25mg IV. Metrogyl 400mg IV. Vancomycin 350mg OD, Piptaz 2.2 gm IV. InjPantop 40mg OD. InjMeropenam 350mg OD, Inj linezolid 350 mg BD. Wound debridement and dressing done daily.
Emergency condition: Condition interfering with respiration and circulation is termed as emergency condition.	Emergency conditions were managed with InjDopamin 10 Ug/kg IV, inj Nor adrenalin 0.3 Ug/kg IV. InjMidaz 3.5mg IV. InjDiazepalm 5mg TDS.

Flow Chart on Disease Process



Nursing Diagnosis

1. Ineffective breathing pattern, dyspnoea r/ tdecreased rate and depth of respirations associated with the depressant effect of some medications
2. Ineffective airway clearance r/t airway spasm, increased mucus secretion and retained secretions
3. Impaired gas exchange r/t ventilation-perfusion inequality as evidenced by client's dependence on supplemental oxygen
4. Impaired level of consciousness r/t cerebral dysfunction
5. Impaired hemodynamic status hypertension r/t congenital kidney disease
6. Impaired blood glucose r/t poor insulin secretion
7. Impaired sensory perception r/t poor consciousness
8. Impaired tissue integrity of cornea related to diminished or absent corneal reflex
9. Electrolyte imbalance r/t renal damage
10. Impaired nutrition pattern r/t poor consciousness and nothing by mouth status
11. Fluid volume excess r/t decreased GFR as evidenced by generalized tissue oedema
12. Impaired skin integrity r/t surgical interventions and prolonged immobility
13. Impaired metabolism r/t decreased thyroid hormone
14. Impaired body temperature r/t infection
15. Impaired growth and development r/t multiple organ dysfunction
16. Impaired communication pattern r/t unconsciousness
17. Disturbed thought processes related to altered level of consciousness
18. Self-care deficit r/t poor consciousness
19. Interrupted family processes related to hospitalization of child
20. Care giver role strains related to poor support system
21. Risk for decreased cardiac output related to fluid overload (kidney dysfunction) and electrolyte imbalance
22. Parental anxiety r/t disease condition and prolonged hospitalization
23. Knowledge deficit of parent's r/g disease condition, treatment and prognosis of disease.

Nursing Care Given

1. Monitored levels of consciousness
2. Monitored condition via ECG, Pulse oxymeter and mechanical ventilator
3. Assessed ventilator setting and mode frequently
4. Assessed status of pain and need for sedation
5. Vitals monitored 1 hourly.
6. RBS and Blood pressure monitored every 2 hourly
7. Intake output was monitored hourly
8. Central line care was provided
9. Suctioning done as needed

10. Position changed every 2 hourly
11. Bed Bath given daily.
12. Back care given every 2 hourly
13. Catheter care was given daily. Catheter was changed as per hospital policy. Tracheostomy dressing done daily
14. Moistened dressing was done on surgical site. Later changed to simple dressing.
15. Soframycin cream for local application on mastoid region.
16. Daily eye care and instillation of Moisal eye drops every 6 hourly
17. Chlorhexidine mouth wash given every 12 hourly
18. Nebulization with normal saline every 4 hourly
19. NG feeding with fresubin-DM with MCT oil as prescribed.
20. Wound debridement was done
21. Asepsis was followed throughout the care
22. Patient prognosis was reported to parents periodically
23. Parental counselling was given

Complications Developed

1. Respiratory failure
2. Vocal cord palsy
3. Cerebral atrophy
4. Aspiration pneumonia
5. Pleural effusion
6. Sepsis
7. Anaemia
8. Liver dysfunction
9. Corneal ulcer
10. Pus at tracheotomy insertion

Prognosis

Prognosis seems to be poor due to multiple organ dysfunction with super added infection.

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