

## Giant T wave inversion with alternating depth, Unique ecg finding in a patient with Feeding jejunostomy.

Dr. Michelle Siew<sup>1</sup>, Dr. Praveen<sup>2</sup>, Dr. Manish<sup>2</sup>, Dr. Bala<sup>3</sup>, Dr. Bharti<sup>3</sup>.

<sup>1</sup>( Junior Resident Cardiac Catheterization Unit, RGSSH, India)

<sup>2</sup>(Department of cardiology, RGSSH, India)

<sup>2</sup>( Department of Preventive and Social medicine, LHMC)

<sup>3</sup>( Department of Anaesthesiology, India)

<sup>3</sup>(Junior Resident, Department of Surgery, India).

Corresponding Author: Dr. Michelle Siew

---

**Abstract:** Feeding Jejunostomy is a surgical procedure by which a tube is inserted in the lumen of the proximal jejunum, primarily to administer nutrition. The complications seen with jejunostomy can be mechanical, infectious, gastrointestinal, or metabolic. The metabolic complications are hypokalemia 50%, hyperglycemia 29%, refeeding syndrome, hypophosphatemia, hypomagnesemia, and vitamin and trace element deficiency. The ecg changes that can be seen in a patient with jejunostomy can have various presentation depending on the cause. The causes can be electrolyte imbalance, Refeeding syndrome or any cardiac pathology present prior to the surgery.<sup>1</sup>

This article is unique because of very distinctive ecg presentation that depicts giant T wave inversion with alternating depth. This ecg presentation occurred in the patient post feeding jejunostomy without any premorbid cardiac pathology.

This article also focuses on the importance of nutritional rehabilitation in order to prevent complications of feeding jejunostomy.

**Keywords:** Feeding Jejunostomy, Ecg- electrocardiogram, Refeeding syndrome.

---

Date of Submission: 26-08-2019

Date of Acceptance: 10-09-2019

---

### I. Background

Feeding Jejunostomy is a surgical procedure by which a tube is inserted in the lumen of the proximal jejunum, primarily to administer nutrition. There are many techniques used for jejunostomy: longitudinal Witzel, transverse Witzel, open gastrojejunostomy, needle catheter technique, percutaneous endoscopy, and laparoscopy.

The principal indication for a jejunostomy is as an additional procedure during major surgery of the upper digestive tract, where irrespective of the pathology or surgical procedures of the esophagus, stomach, duodenum, pancreas, liver, and biliary tracts, nutrition can be infused at the level of the jejunum. It is also used in laparotomy patients in whom a complicated postoperative recovery is expected, those with a prolonged fasting period, those in a hypercatabolic state, or those who will subsequently need chemotherapy or radiotherapy.

The complications seen with feeding jejunostomy can be mechanical, infectious, gastrointestinal, or metabolic. The metabolic complications are hypokalemia 50%, hyperglycemia 29%, Refeeding syndrome, hypophosphatemia, hypomagnesemia, and vitamin and trace element deficiency. The ecg changes that can be seen in a patient with jejunostomy can have various presentation depending on the cause. The causes can be electrolyte imbalance, Refeeding syndrome or any cardiac pathology present prior to the surgery.<sup>1</sup>

**CLINICAL CONSEQUENCES OF SEVERE HYPOKALEMIA<sup>2</sup>**

Paralysis  
Paresthesia  
Rhabdomyolysis  
Respiratory depression  
Weakness  
Cardiac Arrhythmias  
Hypotension  
Digoxin toxicity  
Cardiac arrest  
Constipation  
Paralytic ileus  
Renal Decreased urinary concentrating ability  
Metabolic alkalosis  
Glucose intolerance

Hypokalemia results in slowed conduction, delayed ventricular repolarization, shortened refractory period and increased automaticity.<sup>3</sup> ECG changes include flattening and inversion of T waves in mild hypokalemia, followed by Q-T interval prolongation, visible U wave and mild ST depression in more severe hypokalemia. Severe hypokalemia can also result in arrhythmias such as Torsades de points and ventricular tachycardia.<sup>4</sup>

Whereas the ecg changes in hypocalcemia can be intermittent QT prolongation, or intermittent prolongation of the QTc (corrected QT interval) secondary to a lengthened ST segment. Although rare, this may lead to arrhythmias such as torsades de pointes, VT, or complete heart block.<sup>5</sup>

Hypophosphatemia can also causes ecg changes like QT prolongation. Hypophosphatemia also causes impaired **cardiac** contractility occurs, leading to generalized signs of myocardial depression.

This article is unique because of very distinctive ecg presentation that depicts giant T wave inversion with alternating depth that followed in the patient post feeding jejunostomy without any premorbid cardiac pathology

Giant negative T waves (GNTs) was defined in 1979 by Yamaguchi et al<sup>6</sup> as negative T waves with greater than 10mm (1 mV) amplitude. The study also showed that the T wave inversion have been associated with a variety of clinical conditions, including coronary artery disease, hypertrophic cardiomyopathy, left or right ventricular hypertrophy with strain, cerebrovascular accidents, and long QT syndromes (LQTS) and electrolyte imbalance (potassium or calcium deficiency).

This article also emphasizes on the importance of nutritional rehabilitation in order to prevent complications of feeding jejunostomy.

## II. Case Presentation

A 35 year old Female brought in the emergency department by her husband with altered sensorium. The husband gave history of altered sensorium and drowsiness for 15 minutes. The patient became conscious thereafter. The patient denies any abnormal body movements, urinary incontinence, aura, tongue bite, opisthotonus or abnormal arching of the body, carpo pedal spasm, tremor, pallor/diaphoresis/nausea/vomiting, photophobia/phonophobia, head trauma, fever, neck stiffness, focal neurological deficit, previous similar episode.

**Past history:** Patient had constipation/ abdominal distention and weight loss for 3 years. She was later on diagnosed with stricture due to peptic ulcer disease. The patient was managed with medical treatment. After wards the patient felt relieved but abdominal distention and constipation didn't improve. Patient underwent distal gastrectomy and feeding jejunostomy in august 2018. Post operative condition was uneventful.

**Personal history:** Patient is married with no children, Patient diet is non vegetarian, patient is a non smoker/non alcoholic.

**Menstrual history:** Amenorrhea for past 6 months

**Examination:** Patient lying comfortably in bed.  
 Patient conscious, Oriented to time/place and person.  
 No pallor/ no icterus/ no cyanosis/no clubbing/no lymphadenopathy.

**Vitals:**

BP= 104/66 mmhg  
 PR= 70/ min, regular  
 Weight=35  
 Height- 152 cm  
 BMI- 15

CVS- S1/S2 normal, no additional heart sound.

RESPIRATORY- Bilateral air entry clear, no additional sound.

CNS- Within normal limit .

ABDOMINAL- Moving well with respiration.

There is 25x5 cm surgical incision marks present.

4 staples are present on scar mark

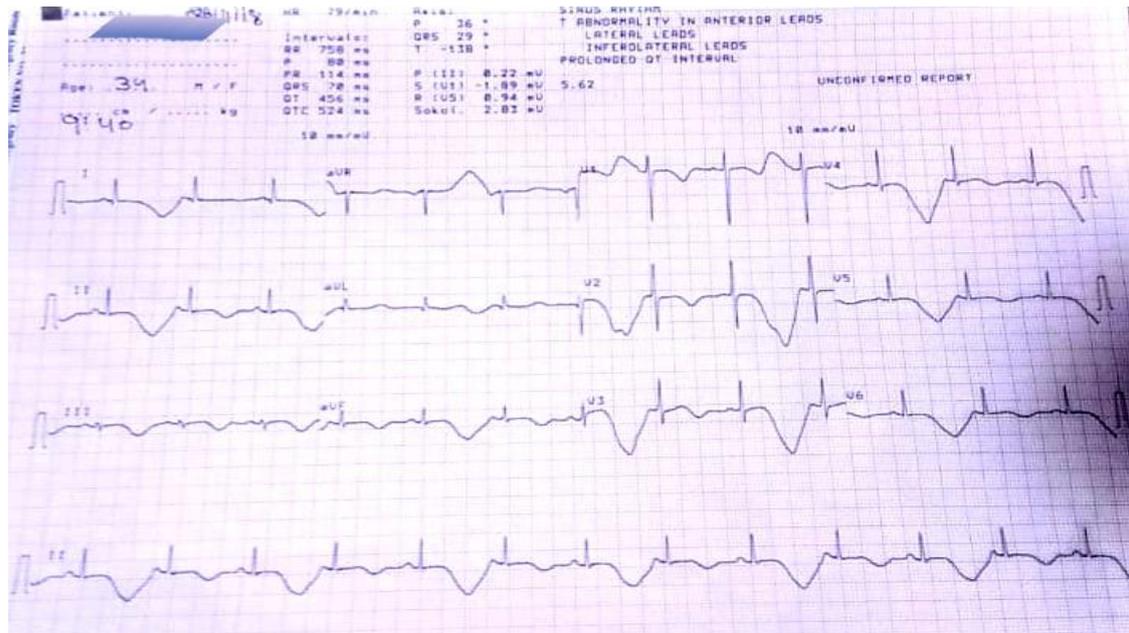
4x 2x 2 cm wound gap is present below umbilicus with healthy granulation tissue.

2x 1x 1cm wound gap is present above umbilicus filled with serous fluid. Healthy granulation tissue seen when serous fluid wiped with cotton.

On the left hypochondrium a feeding jejunostomy is present.

**INVESTIGATION-** Evaluation for loss of consciousness was done.

The ECG showed T wave inversion measuring upto 15 mm in lead V2 and V3 with alternating depth best seen in lead II.

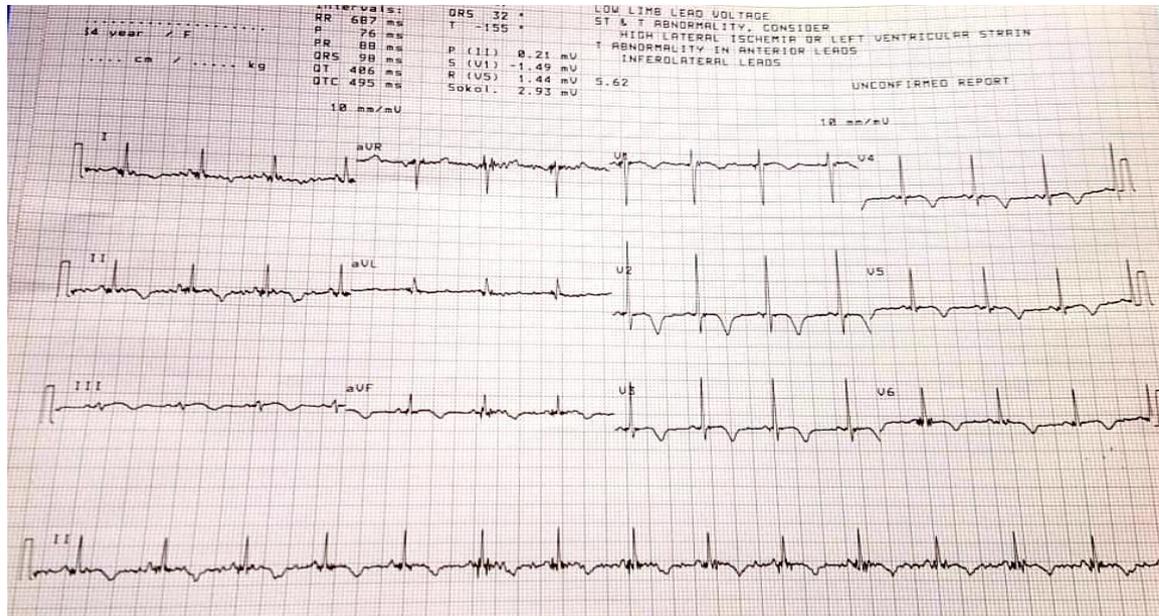


The electrolyte panel showed low serum sodium, calcium and potassium, glucose.

	26/11/2018	27/11/2018	28/11/2018
Sodium	120	139	143
Calcium (T/I)	7.4/0.47(mmol/l)	8.5/0.80	9/1.3
Potassium	2.78	3.2	4.0
Glucose	89	112	107

CT scan Head- Normal  
CT abdomen- Normal

**Treatment-** The patient was treated with calcium, potassium, trace element, vitamins and proper nutritional rehabilitation. The patient and family was educated about the proper method feeding jejunostomy. The patient improved clinically. The electrolytes also improved as shown in the table, The ecg findings after correction of potassium and calcium became normal as shown below .



### III. Conclusion

Study by [Tapia J et.al](#) mentioned the complications of feeding jejunostomy. The study showed that the complications seen with jejunostomy can be mechanical, infectious, gastrointestinal, or metabolic. There are very few publications on the complications and the cause of the complications of feeding jejunostomy. The study covered wide spectrum of complication associated with feeding jejunostomy including electrolyte disturbances.

The electrolyte disturbances seen in our case report is consistent with previous studies such as [Tapia J et al.](#)

There are many journals depicting ecg changes due to hypokalemia like the study conducted by [Diercks DB, Shumaik GM, Harrigan RA, Brady WJ, Chan TC.](#) Electrocardiographic manifestations: electrolyte abnormalities. *J Emerg Med.* 2004;27(2):153–60. According to this study the earliest electrocardiogram (ECG) change associated with hypokalemia is a decrease in the T-wave amplitude. As potassium levels decline further, ST-segment depression and T-wave inversions are seen, while the PR interval can be prolonged along with an increase in the amplitude of the P wave.

Study conducted by [Li Yue-Chun, MD and Jia-Feng Lin, MD, Medicine \(Baltimore\).](#) Their case report described 2 patients without AMI who developed rare giant T-wave inversions measuring up to 35mm in depth and QT prolongation after admission to hospital. <sup>7</sup>While 1 patient presented with acute pulmonary edema, the other patient presented with severe chest pain at rest and transient ST elevation.

In another study conducted by [Salah AM Said et al,](#) Giant T-wave inversion ( $\geq 10$  mm) was found in the patients with pheochromocytoma (20 mm) followed by electroconvulsive therapy (15 mm) then ischemic heart disease (10 mm)<sup>8</sup>.

So far the only study that has shown association between Giant t wave inversion with hypokalemia and hypocalcemia is the study conducted in 1979 by [Yamaguchi et al](#) the study described giant T wave inversion as negative T waves with greater than 10mm (1mV) amplitude. The study also described the association of giant t wave inversion with a variety of clinical conditions, including coronary artery disease, hypertrophic cardiomyopathy, left or right ventricular hypertrophy with strain, cerebrovascular accidents, and long QT syndromes (LQTS) and electrolyte imbalance (potassium or calcium deficiency).

This case report illustrates a unique Ecg finding with giant T wave inversion with alternating depth that can be contributed to hypokalemia and hypocalcemia, both seen in the patient in our case report.

Feeding jejunostomy is a very essential procedure for nutrition in patients with gastrointestinal surgery or conditions compromising the distal gastrointestinal tract. The metabolic complications associated with feeding jejunostomy in this case was due to improper nutritional rehabilitation technique.

This case report also emphasizes on the essential concept of patient education and proper nutritional rehabilitation in patient with feeding jejunostomy that can prevent serious life threatening complication.

#### **Competing Interest**

None Declared.

#### **References**

- [1]. [Tapia J<sup>1</sup>, Murguía R, García G, de los Monteros PE, Oñate E.](#) Nutritional Support Department, Hospital de Especialidades del Centro Medico Nacional, Mexican Institute of Social Security (IMSS), Avenida Cuauhtemoc 330, Col. Doctores, CP 06720 Mexico, D.F., Mexico. 1999 Jun;23(6):596-602.
- [2]. M. A. Crook, BSc, MB, BS, PhD, FRCPath, V. Hally, BSc, SRD, and J. V. Panteli, BSc, SRD. *Nutrition* 2001;17:632–637. ©Elsevier Science Inc. 2001
- [3]. Osadchii,OE,Mechanisms of hypokalemia-induced ventricular arrhythmogenicity.*Fundam Clin Pharmacol.* 2010 Oct;24(5):547-59. doi: 10.1111/j.1472-8206.2010.00835.x.
- [4]. Diercks,DB, Shumaik, GM, Harrigan, RA, Brady,WJ, Chan,TC. *J Emerg Med.* 2004 Aug;27(2):153-60.
- [5]. Shawn P E Nishi, Nestor A Barbagelata, Shaul Atar, Yochai Birnbaum, Enrique Tuero [Hypercalcemia-induced ST-segment elevation mimicking acute myocardial infarction.](#) *J Electrocardiol:* 2006, 39(3);298-300
- [6]. Yamaguchi H, Ishimura T, Nishiyama S, et al. Hypertrophic nonobstructive cardiomyopathy with giant negative T waves (apical hypertrophy): ventriculographic and echocardiographic features in 30 patients. *Am J Cardiol.* 1979; 44:401–412.
- [7]. [Li Yue-Chun, MD and Jia-Feng Lin, MD, Medicine \(Baltimore\).](#) 2014 Jun;93(4):e39.
- [8]. [Salah AM Said, Rene Bloo, Ramon de Nooijer, and Andries Slootweg.](#) *World J Cardiol.* 2015 Feb 26; 7(2): 86–100.

Dr. Michelle Siew" Giant T wave inversion with alternating depth, Unique ecg finding in a patient with Feeding jejunostomy." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 9, 2019, pp 14-18.