Letter to the Editor

# Nasogastric Tube Induced Myocardial Injury – Fact or Coincidence?

**Dear Editor,**

Nasogastric tube insertion is a procedure commonly done in the hospital for dysphagia, poor feeding or for resting the gut after abdominal surgery. Although there are reports of cardiovascular complications associated with endoscopy, a search through the English language literature did not reveal any reports of cardiovascular complications associated with nasogastric tube insertion. We report 2 cases of myocardial infarction after nasogastric tube insertion to highlight the possibility of myocardial injury associated with nasogastric tube insertion.

**Cases**

The first case was an 85-year-old Chinese man with the complaints of fever and shortness of breath of 1-day duration. He had a past medical history of stroke, ischaemic heart disease and congestive cardiac failure, hypertension, diabetes mellitus and chronic obstructive airways disease, depression and benign prostatic hyperplasia with transurethral resection done. The admitting diagnosis was that of infective exacerbation of chronic obstructive airways disease. He was clinically stable and responded well to intravenous antibiotics. On the third admission day, he complained of difficulty with swallowing. The findings by the speech therapist indicated a high risk of aspiration. Hence, nasogastric tube insertion was recommended. The patient was not keen. He was continued on a modified diet under supervision.

During the admission, the patient was noted to be increasingly withdrawn and was not eating well. On the 10th day of admission, he was commenced on anti-depressants. Over the next week or so, his mood and oral feeding improved. On the 23rd day of admission, he was reviewed by the speech therapist. This time he agreed to insertion of the nasogastric tube as he was still at high risk of aspiration.

On the 24th day of admission, he was found in cardiorespiratory collapse. Cardiopulmonary resuscitation was commenced and within 10 minutes, there was return of a spontaneous circulation and spontaneous breathing. An electrocardiogram done at this point showed a new right bundle branch block with ST elevation in the inferior leads. The impression was that of an acute myocardial infarction. The patient was not a candidate for percutaneous intervention or thrombolysis; hence we continued to manage him on the general ward. He finally collapsed again on the 25th admission day.

The second patient was a 76-year-old Malay man admitted with complaints of left foot pain. There was a history of cognitive decline, poor feeding and functional decline over the preceding 3 years. He had a background history of hypertension, gastritis and haemorrhoidectomy. Examination was unremarkable except that he was cachectic and depressed looking. He was commenced on an anti-depressant. However, his oral intake continued to be poor.

On the 19th day of admission, the insertion of a nasogastric tube was discussed with the family as he was by then, refusing all food and medication. A nasogastric tube was inserted on the same day. The patient struggled during insertion and pulled the nasogastric tube out several times.

On the 22nd admission day (3 days after the initiation of nasogastric feeding), the patient was noted to have loose stools and "not his usual self". Electrocardiogram done at this point showed a 4 mm ST segment depression in the anterolateral leads and 1 mm ST elevation in the inferior leads. Troponin T was noted to be elevated at 2.23. The diagnosis was that of an inferior acute myocardial infarction. He continued to experience episodes of hypotension and on the 24th day of admission, was found in cardiorespiratory collapse.

**Discussion**

Cardiovascular complications are known to be associated with endoscopy. In a prospective study, Thompson et al[1] reported that 34 (52%) of 66 upper gastrointestinal endoscopies and 53 (72%) of 74 colonoscopies were associated with cardiorespiratory events. They reported that cardiorespiratory events were significantly more common in patients with a history of cardiac disease.

Wilcox et al[2] studied 25 hospitalised patients with well-defined coronary heart disease who underwent continuous ambulatory electrocardiographic recording during endoscopic procedures. They reported that 24% of patients had 1 or more episodes of electrocardiographic ischaemia. However, they found that ischaemia did not occur exclusively during the endoscopic procedure and no symptomatic angina or serious arrhythmia occurred during the procedure. They concluded that endoscopic procedures in patients with stable but severe coronary heart disease, when performed with standard medications, monitoring and techniques, rarely result in silent or symptomatic myocardial ischaemia or serious arrhythmias.

The 2 patients we have reported were both elderly, frail and had multiple co-morbidities, including severe ischaemic

cardiomyopathy in the first patient. Though nasogastric tube insertion is usually thought to be innocuous, it may have serious complications, especially in the infirm elderly. If the myocardial events were truly related to the nasogastric tube insertion, we would like to postulate the possible pathophysiology.

First, insertion of the nasogastric tube is a stressful event to the patient. This produces a surge in the levels of catecholamines and leads to tachycardia. This, in the presence of an already weakened heart, may precipitate myocardial ischaemia or even infarction.

Secondly, nasogastric tube insertion, through stimulation of the oropharynx and oesophagus, may induce an autonomic response, which is detrimental to the heart. In a study on changes in the autonomic nervous system during endoscopic retrograde cholangiography (ERCP), Ochi et al[3] reported that autonomic nervous activity varied greatly during ERCP. They postulated that autonomic changes may be a factor in cardiac complications. The close proximity of the vagus nerve and the sympathetic ganglia with the oesophagus within the neck raises the possibility of both sympathetic and parasympathetic responses to manipulation.

Third, instrumentation of the oesophagus may cause oesophageal spasm, a well-known association. A study by Manfrini et al[4] showed that there is a close association between coronary spasm and oesophageal spasm.

## Conclusion

We realise that there have been no such reports linking nasogastric tube insertion with myocardial events. This can be due to a lack of awareness of such complications. Secondly, the cardiovascular effects on different individuals may be variable and often minimal, and thus often go unnoticed.

We hypothesise that insertion of a nasogastric tube in frail elderly patients is not as innocuous as we think, but is possibly associated with cardiovascular complications, including myocardial infarction. Based on the cases presented, the association is not conclusive. A study should be done to investigate the effect of nasogastric tube insertion on the elderly cardiorespiratory system. We propose monitoring changes in the electrocardiogram, cardiac enzymes, blood pressure, pulse rate and oxygen saturation as well as oesophageal manometry before, during and after the procedure. The results of this study may confirm or refute our hypothesis.

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