Gastric Pacing For Diabetic Gastroparesis - Does It Work?

Abstract:
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The management of diabetic gastroparesis resistant to medical therapy is very difficult. Gastric electrical stimulation (GES) is a relatively new therapeutic modality which has shown some promise in international trials. It has been used in four patients in Ireland. Our aim was to determine if GES improved patients outcomes in terms of duration and cost of inpatient stay and glycaemic control. We reviewed the patients case notes and calculated the number of days spent as an inpatient with symptomatic gastroparesis pre and post pacemaker, the total cost of these admissions, and patients average HbA1c pre and post GES. Mean length of stay in the year pre GES was 81.75 days and 62.25 days in the year post GES (p=0.89). There was also no improvement in glycaemic control following GES. GES has been ineffective in improving length of inpatient stay and glycaemic control in our small patient cohort.

Methods
The records of all four patients with gastric pacemakers inserted were reviewed. The number of inpatient days which each patient spent (in either Cork University Hospital or their local hospitals) due to gastroparesis in the year before pacemaker insertion was calculated and compared with the number of inpatient days spent by each patient since pacemaker insertion. Each patients medical records were reviewed to confirm that the cause of admission was gastroparesis. From these figures, a cost benefit analysis was performed to see if the commencement of GES led to a reduction in the costs incurred due to inpatient admission for gastroparesis. The bed day costs were calculated using 2008 bed day costs from the Irish Health Service Executive (HSE) for Cork University Hospital. The average HbA1C for each patient for the twelve months before pacemaker was calculated and compared with the average HbA1C post pacemaker insertion.
pacemaker insertion. The number of attendances which each patient had with the dietician / nutritionist was also noted. Data collection was terminated at the end of September 2007.

Results

Four patients in Ireland have had gastric pacemakers inserted; all were patients with type one diabetes mellitus. The first patient was 37 at presentation and had suffered from type one diabetes mellitus for twelve years. He had an eighteen month history of recurrent symptomatic gastroparesis, each episode lasting up to two weeks. Each episode began with nausea and bloating which were then followed by severe, intractable vomiting. He also suffered from erectile dysfunction and non nephrotic range proteinuria at diagnosis.

Our second patient was a 25 year old female with type one diabetes mellitus for twelve years also. She had a one year history of the same symptom complex as the above patient, and also suffered from nocturnal diarrhoea and faecal incontinence. She had numerous diabetic complications at diagnosis – bilateral cataracts and preproliferative diabetic retinopathy. Our third patient was a 25 year old male with type one diabetes mellitus of nineteen years duration. He presented with an eighteen month history of intractable nausea and vomiting, as well as diabetic retinopathy and stage 2 chronic kidney disease. Our fourth patient is a 60 year old female who presented with frequent episodic vomiting for two years. She had type one diabetes mellitus for over twenty years. * patient 4 deceased

As outlined in the table, there was no significant difference in the numbers of days of admission to hospital pre-GES versus post-GES for any of our patients (p = 0.89 when lengths of stay pre and post GES were compared). Glycaemic control was not significantly affected either. None of the patients have had repeat gastric emptying studies. There was no significant difference in the number of attendances each patient had with the dietician / nutritionist pre and post GES. When each patients case notes were reviewed in more detail, each patient was on broadly similar nutritional supplementation pre and post GES. Symptomatology pre and post GES was not formally assessed but only patient 3 reported any subjective improvement in his symptoms after GES.

Discussion

It is clear from the above that gastroparesis places a large burden on the Irish healthcare system. In 2008, the cost of a general medical bed in Cork University Hospital per patient per day was 990 euro. Therefore (using 2008 costs), it cost 118100 euro to keep patient 3 as an inpatient for the year preceding his gastric pacemaker insertion. This huge cost has also been shown in the United States where, in just one state (North Carolina), diabetic gastroparesis accounted for 7850 bed days in one year which had a total cost of $11,378,446. (For the purposes of comparison the
In summary, we concluded that the long term cost effectiveness of GES (in terms of the number of patient admissions) and its benefits for glycaemic control have yet to be proven in the Irish healthcare setting. Although the number of patients in our study was small and follow-up was limited, we cannot recommend the use of GES in patients with symptomatic diabetic gastroparesis based on our evidence to date. However, larger studies, refinement of current GES technologies and further development of new GES systems may lead to benefits for patients with this condition.

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References