

Cost-effectiveness of patency capsule test prior to wireless capsule endoscopy

Authors: Keeley Fairbrass,^A Deloar Hoshen,^A Helen Bailey,^A Jason Jennings^A and Venkat Subramanian^A

Introduction

Capsule endoscopy is a non-invasive technique intended for studying the small bowel and/or colon. It uses a small wireless camera to take pictures of the digestive tract. Although it is a safe procedure, it is possible for a capsule to become lodged in the digestive tract. A patency capsule is a pre-test that is now widely used prior to wireless capsule endoscopy (WCE) to reduce the incidence of capsule retention.¹ The objective of this study is to evaluate the cost-effectiveness of the patency capsule test prior to WCE and to see whether selective use of it, by using an algorithm, is a cost-effective strategy.

Materials and methods

Patients who underwent the WCE and patency test between March 2016 and January 2018 were identified using the electronic endoscopy database. Electronic records and imaging were reviewed to assess indications, complications and outcomes. The Leeds Teaching Hospitals NHS Trust (LTHT) algorithm was used for selecting patients with high-risk features, suitable for patency capsule prior to WCE. High-risk features included known or suspected Crohn's disease, previous abdominal surgery, abdominal pain being the predominant symptom or those without prior abdominal imaging. Differences between the group who had a patency test and the group who did not were analysed using Fisher's exact two-tailed test.

The 2016/2017 NHS tariff codes were used to calculate the direct costs associated with the procedure, radiological imaging, and treatment of associated complications.² We reviewed whether the application of an algorithm to select high-risk patients is beneficial both in terms of outcome and cost-effectiveness.

Results and discussion

A total of 214 (female (f)=124; male (m)=90) patients were referred for WCE in this period. Patients with a high risk of retention based on our algorithm had a patency capsule prior to WCE n=66 (f=33; m=33), while 148 (f=91; m=57) proceeded straight to WCE.

Table 1. Cost-effectiveness of using a patency capsule with applied algorithm

	Scenario A		Scenario B		Scenario C		
	Average cost per patient (£)	Patients - no. (%)	Cost (£)	Patients - no. (%)	Cost (£)	Patients - no. (%)	Cost (£)
Patency capsule	116	66 (31)	7,656	214 (100)	24,824	0	0
Interventions required from FP of patency	81.50	24 (36)	1,956	77 (36)	6275	0	0
Interventions required from TP of patency	119	2 (3)	238	6 (3)	714	0	0
Cost of WCE (-TP patients)	771	212	163,452	208	160,368	214	164,994
Interventions required from FP of WCE	31	10 (5)	310	10 (5)	310	88 (41)	6617
Interventions required from TP of WCE (eg, surgical complications, imaging)	2,710	0	0	0	0	6 (3)	16,260
Total			173,612		192,491		187,871

Scenario A = using The Leeds Teaching Hospitals NHS Trust algorithm to select patients for patency prior to wireless capsule endoscopy; Scenario B = all patients referred for wireless capsule endoscopy also have patency capsule; Scenario C = all patients straight to wireless capsule endoscopy without patency capsule.

A significant proportion of patients given a patency capsule were being investigated for small bowel enteropathy or Crohn's disease ($p < 0.001$), while those with iron deficiency anaemia or obscure gastrointestinal (GI) bleeding generally went straight to test ($p < 0.001$).

We identified 24 (f=16; m=8) false-positive results with patency capsules, with additional investigation costs of £1,956. Two (f=1; m=1) true positive results with patency capsules had radiological interventions costing £238 and did not have WCE.

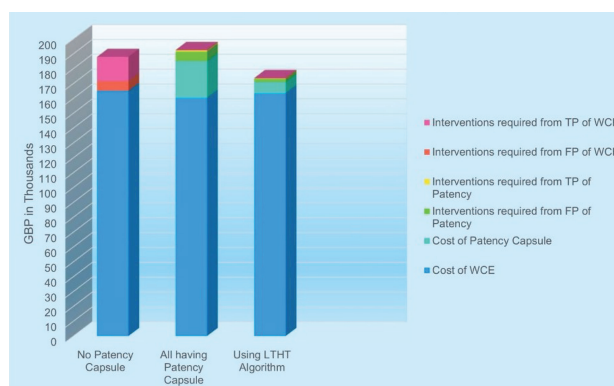


Fig 1. Costs in total for 214 patients in GBP (£).

Authors: ^ALeeds Teaching Hospitals, Leeds, UK

By applying our algorithm of selecting high-risk patients, we showed that the cost per patient for a WCE was £811. This was cost-effective when compared with avoiding the use of patency capsules (£877 per patient) or using patency for all referrals prior to WCE (£899 per patient; see Table 1 and Fig 1).

Conclusion

Using a selective approach to the use of patency capsules is cost-effective when compared with other strategies and saves between £66 and £88 per patient despite having a high rate (36%) of false-positive tests. ■

Conflicts of interest

None declared.

References

- 1 Mustafa BF, Samaan M, Langmead L, Khasraw M. Small bowel video capsule endoscopy. *Expert Rev Gastroenterol Hepatol* 2013;7:323–9.
- 2 Department of Health and Social Care. *NHS costing manual*. GOV. UK, 2012. www.gov.uk/government/publications/nhs-costing-manual [Accessed 6 February 2020].