NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Medical technology consultation document

Endocuff Vision for assisting visualisation during colonoscopy

The National Institute for Health and Care Excellence (NICE) is producing guidance on Endocuff Vision for assisting visualisation during colonoscopy in the NHS in England. The medical technologies advisory committee has considered the evidence submitted by the company and the views of expert advisers.

This document has been prepared for public consultation. It summarises the evidence and views that have been considered, and sets out the recommendations made by the committee. NICE invites comments from the public. This document should be read along with the evidence (see the committee papers).

The advisory committee is interested in receiving comments on the following:

- Has all of the relevant evidence been taken into account?
- Are the summaries of clinical and resource savings reasonable interpretations of the evidence?
- Are the recommendations sound and a suitable basis for guidance to the NHS?
- Are there any equality issues that need special consideration and are not covered in the medical technology consultation document?

Note that this document is not NICE's final guidance on Endocuff Vision for assisting visualisation during colonoscopy. The recommendations in section 1 may change after consultation.

After consultation the committee will meet again to consider the evidence, this document and comments from the public consultation. After considering the comments, the committee will prepare its final recommendations which will be the basis for NICE's guidance on the use of the technology in the NHS in England. For further details, see the medical technologies evaluation programme process and methods guides.

The key dates for this guidance topic are:

Closing date for comments: 12 March 2019

Second committee meeting: 22 March 2019

Details of the advisory committee are given in section 5.

NICE medical technologies guidance addresses specific technologies notified to NICE by companies. The 'case for adoption' is based on the claimed advantages of introducing the specific technology compared with current management of the condition. This case is reviewed against the evidence submitted and expert advice.

If the case for adopting the technology is supported, the specific recommendations are not intended to limit use of other relevant technologies that may offer similar advantages. If the technology is recommended for use in research, the recommendations are not intended to preclude the use of the technology in the NHS but to identify further evidence which, after evaluation, could support a recommendation for wider adoption.

The scope of this evaluation includes patients undergoing colonoscopy as part of the NHS Bowel Cancer Screening Programme (BCSP). The UK National Screening Committee is responsible for deciding whether new technologies, such as Endocuff Vision, are formally incorporated into screening pathways. The BSCP is covered by service specification number 26. Service specifications are updated annually using a published process which is available here.

1 Recommendations

1.1 Evidence supports the case for adopting Endocuff Vision in the NHS because it improves the adenoma detection rate during colonoscopy, particularly for people having a colonoscopy as part of bowel cancer screening.

1.2 Endocuff Vision should be considered as an option for people having a colonoscopy as part of bowel cancer screening. There is limited evidence for the benefits of Endocuff Vision in a non-screening population.

1.3 Cost modelling shows that for people having a colonoscopy as part of bowel cancer screening, using Endocuff Vision is cost saving. The saving is related to the adenoma detection rate (ADR); for a colonoscopist with a

baseline ADR of 51%, the saving is £53 per patient over 10 years compared with standard colonoscopy.

Why the committee made these recommendations

The bowel cancer screening programme is an NHS service that offers tests (including colonoscopy) to people who are at risk of bowel cancer. Colonoscopy is used to detect bowel cancer but also to identify and remove adenomas that could develop into cancerous lesions if left untreated.

Endocuff Vision is a disposable sleeve that fits over the end of most colonoscopes. It is designed to improve visualisation of the bowel during colonoscopy.

Clinical evidence shows that for people having a colonoscopy as part of bowel cancer screening, using Endocuff Vision improves the adenoma detection rate without increasing how long the procedure takes. Better detection of adenomas is likely to reduce the incidence of subsequent cancers. Cost analyses in this population also suggest that Endocuff Vision is cost saving if the adenoma detection rate is improved by more than 3%.

The clinical and cost effectiveness of Endocuff Vision in other populations (such as people having a colonoscopy unrelated to bowel screening) is less certain because of the limited evidence available.

2 The technology

Technology	Endocuff Vision (Norgine Pharmaceuticals) is a single-use, disposable device which fits over the end of most conventional colonoscopes. It has a row of flexible arms, hinged at the base, which are retracted during insertion and spread out during withdrawal. These arms push out the mucosal folds of the colon, allowing more of the mucosal surface to be viewed. This helps with identifying colonic polyps, specifically adenomas and adenocarcinomas, and increases the likelihood of complete resection as well as helping post-resection scar examination. Endocuff Vision received a CE mark in August 2016 as a class I sterile medical device.
Innovative aspects	The row of flexible arms is designed to increase the diagnostic sensitivity of colonoscopy investigation by increasing the total surface area of the visual field. The company claims that using Endocuff Vision can also improve the stability of the colonoscope and control of the tip.
Intended use	Endocuff Vision is intended to be used as an add-on to a standard colonoscope for people having a colonoscopy: • for an unexplained change in bowel habit, iron deficiency or bleeding from the bowel (including those with positive faecal occult blood test or faecal immunochemical test result) • to remove known polyps, which may be difficult to find, remove or ablate because of their size, position, or previous incomplete removal • for surveillance, after previous adenoma removal • as part of bowel screening investigations following a positive faecal occult blood test. Endocuff Vision is not intended for deep ileal intubation. It should not be used in people with acute, severe colitis or if there is known colonic stricture. It should not be used for complex sub-mucosal dissection when a separate distal attachment is needed.
Costs	The cost of an Endocuff Vision sleeve is £12.05 (excluding VAT) per unit. Endocuff Vision has been selected for the NHS England Innovation and Technology Payment 2018/19 scheme.
For more details, see the website for Endocuff Vision.	

3 Evidence

Clinical evidence

Relevant evidence comes from 4 studies, 2 of which are randomised controlled trials

3.1 Of the 4 studies that met the inclusion criteria in the scope, 2 were randomised controlled trials (ADENOMA and E-Cap) and 2 were non-randomised prospective cohort studies (Rameshshanker et al. 2016 and Tsiamoulos et al. 2018).

A multicentre trial shows that Endocuff Vision increases adenoma detection rates

3.2 ADENOMA was a UK-based, multicentre, single-blind randomised controlled trial (n=1,772) that compared Endocuff Vision-assisted colonoscopy with standard colonoscopy (Ngu et al. 2018). The population comprised adults having a colonoscopy after presenting with clinical symptoms of bowel cancer, for post-polypectomy surveillance, or after a positive faecal occult blood test as part of bowel cancer screening. The results showed that for the whole study population, Endocuff Vision-assisted colonoscopy led to a significant increase in adenoma detection rates compared with standard colonoscopy (p=0.02). Subgroup analyses showed that this was mainly driven by a 10.8% improvement in the screening population, which comprised about 45% of the whole study population; there was no statistically significant improvement in adenoma detection rates in the other patient subgroups.

The 3 single-centre studies are potentially biased by local expertise and so may not be representative of UK practice

3.3 The other randomised controlled trial (E-Cap) was a single-blind, single-centre study (n=531) comparing Endocuff Vision-assisted colonoscopy with standard colonoscopy in adults who had a positive faecal occult blood test as part of bowel cancer screening. Tsiamoulos (2018) was a single-centre pilot service evaluation of Endocuff Vision, set up as a

before-after-study (n=410) in adults who had a positive faecal occult blood test as part of bowel cancer screening. Rameshshanker (2016) was a single-centre study (n=96) that prospectively compared Endocuff Vision-assisted colonoscopy with standard colonoscopy. These 3 single-centre studies showed various levels of improvement in adenoma detection rates with Endocuff Vision-assisted colonoscopies. The external assessment centre (EAC) noted that the level of improvement was inversely related to the expertise of the colonoscopists involved; that is, more benefits were seen with Endocuff Vision when used by colonoscopists with less expertise. Because of this, results of the single-centre studies are likely to be biased by local expertise and so may not be representative of NHS practice. For full details of the clinical evidence, see section 3 of the assessment report.

Cost evidence

The company's model shows that Endocuff Vision is cost saving in people having colonoscopies as part of bowel cancer screening

3.4 The company submitted a de novo cost model which compared Endocuff Vision-assisted colonoscopy with standard colonoscopy in patients having colonoscopies after a positive faecal occult blood test as part of bowel cancer screening. The model comprised a number of interlinked decision trees and Markov models based on an established model of colorectal cancer. The model results showed that over 10 years, using Endocuff Vision in this patient population would save £12 per patient. Sensitivity analyses showed that the cost savings were driven by how much Endocuff Vision improved the adenoma detection rate, because a higher adenoma detection and resection rate is likely to result in a lower incidence of colorectal cancer (see section 4.5).

The EAC's revised model shows that Endocuff Vision is cost saving if it improves the adenoma detection rate by over 3%

3.5 The EAC considered the model structure, use of 1-year cycles and a 10-year time horizon to be appropriate. However, it revised the model to

include more appropriate parameters based on data from the bowel cancer screening programme, including the stage distribution of screen-detected and symptomatic-detected colorectal cancer (Sagar et al. 2015) and the success rate for standard colonoscopy (Lee et al. 2012). The EAC's revised model showed that over 10 years, using Endocuff Vision in a screening population would save around £53 per patient. Sensitivity analyses showed similar results to the company's analyses, with the cost savings mainly driven by how much Endocuff Vision improved the adenoma detection rate. Specifically, the EAC's revised model showed that Endocuff Vision was cost saving when it improved the adenoma detection rate by over 3%.

Endocuff Vision is unlikely to be cost saving for a non-screening population

3.6 The company did not submit an analysis of Endocuff Vision in people having treatment unrelated to bowel cancer screening. The EAC did additional analyses and concluded that Endocuff Vision was unlikely to be cost saving in this population because of the modest gain in adenoma detection rates seen with Endocuff Vision in the ADENOMA trial. For full details of the cost evidence, see section 4 of the assessment report.

4 Committee discussion

Clinical-effectiveness overview

Endocuff Vision improves the adenoma detection rate in people having colonoscopies as part of bowel cancer screening

4.1 The committee noted that 3 of the 4 studies showed that Endocuff Vision improved the adenoma detection rate in people having colonoscopies as part of bowel cancer screening. The ADENOMA trial was the only study powered to detect a difference in adenoma detection rates and the results showed a statistically significant improvement with Endocuff Vision of almost 11%. The EAC concluded that ADENOMA was a high-quality study with a low risk of bias. The clinical experts confirmed that the trial accurately represented NHS clinical practice. The committee considered the E-Cap study which was the only trial that showed no improvement in

adenoma detection rates with Endocuff Vision. It understood that this study included only 4 colonoscopists who already had baseline adenoma detection rates for standard colonoscopy that were much higher than the reported average of 46.5% (Lee et al. 2012). The committee noted that the benefits of Endocuff Vision may have been less apparent in this study because of the colonoscopists' relatively high level of expertise. Having considered all the clinical evidence, the committee concluded that using Endocuff Vision increases the adenoma detection rate in people having colonoscopies as part of bowel cancer screening and noted that the UK National Screening Committee is responsible for deciding if new technologies, such as Endocuff Vision, should be included in relevant screening pathway service specifications.

Using Endocuff Vision may increase the detection of cancers during bowel cancer screening

4.2 The committee noted that secondary outcomes from ADENOMA included a statistically significant increase in the number of detected cancers with Endocuff Vison. The study was not powered to detect differences in cancer detection rates, but the committee considered this secondary outcome to be promising. The committee concluded that more evidence on the detection of cancers during bowel cancer screening with Endocuff Vision would be helpful.

There is limited evidence for the benefits of Endocuff Vision in a non-screening population

4.3 Only 2 of the 4 studies (E-Cap and ADENOMA) included patients having colonoscopies unrelated to bowel cancer screening (n=1,135). E-Cap also included patients who were under surveillance after having polyps removed, but ADENOMA was the only study that involved both symptomatic and surveillance populations. The clinical experts explained that the baseline adenoma detection rate was much lower in people having colonoscopies unrelated to bowel cancer screening, because this population is more heterogeneous in terms of patient age and presenting symptoms than the bowel cancer screening population. The committee

therefore concluded that the benefits of Endocuff Vision are less certain in these patients.

Outcome measures

Adenoma detection rate is the best available surrogate quality indicator for diagnostic colonoscopy but it is influenced by a number of factors

4.4 The committee noted that adenoma detection rate is the most widely used quality indicator for diagnostic colonoscopy: it is used by the Joint Advisory Group on gastrointestinal endoscopy (JAG) and the bowel cancer screening programme to monitor colonoscopy standards. The clinical experts, including a representative from the bowel cancer screening programme, explained that the minimum rate is 40% but that centres aspire to 50%. The clinical experts agreed that the average adenoma detection rate in a screening population was around 50%, and that anything above 65% would be considered exceptional. However, they noted that adenoma detection rates vary in both screening and non-screening populations. The clinical experts also explained that the adenoma detection rate is influenced by a number of factors, including how long the colonoscopist spends inspecting the walls of the bowel, how well the bowel is cleansed, levels of colonoscopist fatigue and the resolution of the colonoscope.

Increased adenoma detection with Endocuff Vision may lead to a reduced risk of interval cancers

4.5 The clinical experts explained that people having bowel cancer screening may develop subsequent cancers that are referred to as 'interval cancers' (that is, cancers that are diagnosed in the intervals between tests). The clinical experts noted that the incidence of interval cancers varies across the UK from 2% to 13%. Detecting and removing more adenomas may lead to a subsequent reduction in the risk of interval cancers (because some adenomas may progress to cancerous lesions). The EAC and clinical experts explained that increases in adenoma detection and

resection rates are associated with a reduced risk of interval cancers. They referred to 2 studies that evaluated this relationship:

- In Kaminski et al. (2010), people who had colonoscopies done by colonoscopists with an adenoma detection rate of less than 20% were at a higher risk of developing interval cancers than people who had colonoscopies done by colonoscopists with an adenoma detection rate of over 20%.
- In Corley et al. (2014), an increase in the adenoma detection rate of 1% resulted in a decrease in the risk of developing interval cancers of 3%.

The clinical experts cautioned that a plateau effect is likely for the adenoma detection rate, above which there would be diminishing effects on interval cancer risk. Because these studies only evaluated baseline adenoma detection rates of up to 50%, it is uncertain if and at what level this plateau would become apparent. The clinical experts were uncertain as to what effect the increase in adenoma detection rate from 50% to 60% (as seen with Endocuff Vison in the ADENOMA trial) would have on interval cancer risk. However, they were not aware of any evidence to suggest that the increase would not be clinically useful. Consequently, the committee concluded that the adenoma detection rate could be considered a predictor of interval cancer risk, and so it is plausible that Endocuff Vision may reduce the incidence of interval cancers.

Side effects and adverse events

Adverse events are about as common with Endocuff Vision-assisted colonoscopy as with standard colonoscopy

4.6 The committee noted that some rare adverse events have been reported with the predecessor device, Endocuff, including colon perforation. The clinical experts explained that Endocuff Vision has been designed to avoid these problems. The committee noted that the incidence of adverse events with Endocuff Vision was comparable to that of standard colonoscopy.

Patient selection

Use of Endocuff Vision should be decided on a case-by-case basis

4.7 The clinical experts explained that the priority in colonoscopy is to achieve a complete procedure (with a high caecal intubation rate) with minimal discomfort to the patient. They noted that the use of Endocuff Vision may cause a small amount of pain and discomfort when inserting the colonoscope, but this is usually temporary and no additional sedation is needed. The clinical experts emphasised that the decision to use Endocuff Vision should be based on clinical judgement taking into consideration patients' comorbidities, physical presentation, symptoms and age.

Use of Endocuff Vision may not be suitable for some patient groups

4.8 The clinical experts described certain circumstances when Endocuff Vision is unlikely to provide benefits. These included: investigating patients with a history of significant anal pathology, moderate to severe diverticulosis or a fixed sigmoid colon; for colonoscopies in young, non-sedated patient because of possible anal trauma; and when inflammatory bowel disease is suspected or active colitis is present. Endocuff Vision should be used with caution in patients aged over 85 years because of the higher risk of diverticular disease. The clinical experts also identified circumstances when using Endocuff Vision may be technically helpful: for example, as an insertion aid in patients with long and mobile colons, or when detecting and removing large polyps or those in difficult areas of the colon.

Relevance to the NHS

The evidence for Endocuff Vison in a screening population is broadly generalisable to the NHS

4.9 All 4 of the included studies were done at UK centres. The ADENOMA trial recruited patients across 7 NHS centres and involved a total of 48 colonoscopists with varying skill levels. Each site was allowed to have no more than 4 bowel cancer screening programme colonoscopists. The

committee was aware of the role of JAG accreditation for colonoscopists in the bowel cancer screening programme. The bowel cancer screening programme establishes quality standards for screening colonoscopy, provides training resources for staff and records a national audit of the screening service. A representative from the screening programme confirmed that the use of Endocuff Vision is currently an option for screening colonoscopists. The committee recalled that the results of the single-centre studies were potentially biased by local expertise (see section 3.3) but it understood that the expertise of colonoscopists varied across the NHS. The committee concluded that overall the evidence was broadly generalisable to the NHS.

NHS considerations

It takes 20 to 30 procedures to become fully competent in using Endocuff Vision

4.10 Endocuff Vision is compatible with most colonoscopes and is available in 4 different sizes, depending on the diameter of the colonoscope used for the procedure. The clinical experts emphasised the importance of selecting the correct size and ensuring that Endocuff Vision is securely fitted to avoid detachment during the procedure. The clinical experts clarified that using Endocuff Vision is associated with a learning curve: in the ADENOMA trial, colonoscopists needed specific training and had to have done at least 20 procedures with Endocuff Vision before starting the study. The clinical experts considered that 20 to 30 procedures with Endocuff Vision would be sufficient to ensure competency.

Endocuff Vision may be most beneficial when used by colonoscopists with low-to-moderate baseline adenoma detection rates

4.11 The committee recalled the EAC's conclusion that the level of improvement in the adenoma detection rate with Endocuff Vision was inversely related to the expertise of the colonoscopists involved; that is, more benefits were seen with Endocuff Vision when used by colonoscopists who had lower baseline adenoma detection rates (see

section 3.3). The EAC identified a recent meta-analysis (Williet et al. 2018) which showed that Endocuff Vision (or its predecessor device Endocuff) improved adenoma detection rates in colonoscopists with low-to-moderate baseline rates (less than 35%) but not in colonoscopists with high baseline rates (over 45%). The clinical experts broadly agreed with this observation, but noted that statistically significant improvements were still seen in the ADENOMA trial even when baseline adenoma detection rates were above 45%.

Service implications

Endocuff Vision is unlikely to affect overall procedure time but may increase efficiency by helping with polyp removal

4.12 The results of the ADENOMA trial showed that the use of Endocuff Vision does not increase overall procedure time. The clinical experts also noted that in the trial, the withdrawal time for Endocuff Vision was comparable to that of standard colonoscopy despite more polyps being removed: this suggested that Endocuff Vision may increase efficiency. The clinical experts confirmed that this accurately reflected their own clinical experience; they added that Endocuff Vision may help with polyp removal by anchoring the scope and providing a degree of device stability. In the ADENOMA trial, inserting Endocuff Vision took 1 minute less than inserting a standard colonoscope. Although the clinical experts considered this to be a notable time saving, they understood that it would be unlikely to lead to an increase in patient throughput. However, they clarified that any improvements in procedure efficiency may lead to lower levels of colonoscopist fatigue and may be of particular value in complex cases.

Cost modelling

The EAC's revised model is more suitable for decision-making

4.13 The committee considered the EAC's changes to the company's cost model (see section 3.5) and agreed that the updated parameters better reflected cost and resource use in a UK screening population. The

committee acknowledged the unusually large number of assumptions in the cost modelling, but considered that this approach was necessary to fully capture Endocuff Vision's effect on adenoma detection rates and the likely incidence of interval cancers.

Main cost drivers

A 3% improvement in the adenoma detection rate is plausible with Endocuff Vision in a UK screening population

4.14 The EAC's sensitivity analyses showed that Endocuff Vision was cost saving when it improved the adenoma detection rate by over 3%. The clinical experts explained that this level of improvement was feasible in the context of a UK screening programme. Furthermore, the committee noted that the results of the ADENOMA trial implied that a 3% improvement is plausible even within a service delivered by colonoscopists with high baseline adenoma detection rates (and therefore high levels of expertise).

Cost savings

Endocuff Vision is cost saving for people having colonoscopies as part of bowel cancer screening

4.15 The EAC's revised cost model showed that over 10 years, the use of Endocuff Vision was associated with a cost saving of around £53 per patient if used by a colonoscopist with a baseline adenoma detection rate of 51%. An EAC scenario analysis showed that when initial screening is done using faecal immunochemical testing instead of faecal occult blood testing, the estimated cost saving per patient with Endocuff Vision increased to around £58. The committee noted that, although clinical evidence for Endocuff Vision has come from a population who tested positive to a faecal occult blood test, the technology is likely to be of benefit in those testing positive to a faecal immunochemical test since the use of this test does not fundamental change the colonoscopy procedure itself. The EAC also adapted the model to a non-screening population (see section 3.6), and results showed that using Endocuff Vision in this

population is likely to incur additional costs. The committee concluded that using Endocuff Vision in people having colonoscopies as part of bowel cancer screening is likely to be associated with a small cost saving, largely through a reduced incidence of interval cancers and by allowing the diagnosis of cancers at an earlier stage. The committee concluded that on the basis of the evidence presented, the case for adopting Endocuff Vision in a screening population was supported.

5 Committee members and NICE project team

Committee members

This topic was considered by the medical technology advisory committee which is a standing advisory committee of NICE.

Committee members are asked to declare any interests in the technology to be appraised. If it is considered there is a conflict of interest, the member is excluded from participating further in that evaluation.

The minutes of each committee meeting, which include the names of the members who attended and their declarations of interests, are posted on the NICE website.

NICE project team

Each medical technologies guidance topic is assigned to a team consisting of 1 or more technical analysts (who act as technical leads for the topic), a technical adviser and a project manager.

Rebecca Brookfield, Alexia Campbell-Burton
Technical analysts

Lizzy Latimer, Bernice Dillon
Technical advisers

Jae Long
Project manager