NICE National Institute for Health and Care Excellence

NICE guidance

Endo-SPONGE for treating low rectal anastomotic leak

Medical technologies guidance
Published: 16 December 2021

www.nice.org.uk/guidance/mtg63

Your responsibility

This guidance represents the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take this guidance fully into account, and specifically any special arrangements relating to the introduction of new interventional procedures. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Commissioners and/or providers have a responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties. Providers should ensure that governance structures are in place to review, authorise and monitor the introduction of new devices and procedures.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

This guidance replaces MIB188.

1 Recommendations

1.1 Endo-SPONGE shows promise for treating low rectal anastomotic leaks. However, there is not enough good-quality evidence to support the case for routine adoption in the NHS.

1.2 Further evidence in the form of real-world data collection is recommended to address uncertainties about selection criteria, patient-reported outcome measures, stoma reversal and bowel function recovery compared with other treatments. Find out more in the section on further research in this guidance.

Why the committee made these recommendations

Anastomotic leak is a serious complication after colorectal surgery. Endo-SPONGE is designed to treat leaks after a low rectal anastomosis.

There's not enough evidence assessing the clinical effectiveness of Endo-SPONGE compared with other non-surgical or surgical treatments in the NHS. Observational studies suggest that Endo-SPONGE may stop anastomotic leakage and reduce the chance of a permanent stoma, but this evidence is weak.

There are also uncertainties about the cost impact of using Endo-SPONGE in the NHS because of the weak clinical evidence.

2 The technology

Technology

2.1 Endo-SPONGE is a minimally invasive surgical treatment for anastomotic leak in the low rectal area. It consists of an open-pore sponge with a drain tube, a sponge pusher, silicon overtube guides and a drainage set and system. The system is designed to improve the clearance of leaking discharge in the anastomotic cavity and to promote granulation tissue formation and healing. Risks associated with Endo-SPONGE include residual sponge particles left in the cavity, erosion of structures next to the sponge, injury to the intestinal wall and bleeding.

2.2 The sponge needs to be replaced every 2 to 3 days. The replacement sponge is cut to the size of the leaking cavity as it gets smaller and the drainage tube exits the body through the anus. The first insertion procedure is usually done in an operating theatre under general anaesthesia. The replacement procedures can be done in a day-case theatre or endoscopy suite under light sedation.

Innovative aspects

2.3 Endo-SPONGE is an endoluminal vacuum therapy device. The sponge is inserted into the leaking cavity using a flexible endoscope or open access through the anus. A drainage tube is connected to the sponge at one end with a drainage bottle at the other end. The bottle has a low-vacuum drainage container that uses suction to put continuous negative pressure on the sponge.

Intended use

2.4 Endo-SPONGE is intended for people with an extraperitoneal rectal anastomotic leak. It is inserted by colorectal surgeons, endoscopists and gastroenterologists in hospital. The Endo-SPONGE system is not suitable for the following conditions: malignant tumour wound, necrotic tissue or

gangrene, untreated osteomyelitis, anastomotic leak directly adjacent to vessels, bladder or small bowel obstruction, non-drainable septic focus, systemic sepsis and clotting disorders.

Relevant pathway

2.5 NICE has not published guidelines on rectal anastomotic leak and the clinical experts said that there is no standard care pathway. The Association of Coloproctology of Great Britain and Ireland's (ACPGBI) guidance on the prevention, diagnosis and management of colorectal anastomotic leakage (March 2016) says that people with anastomotic leaks who are clinically stable may have conservative treatment using fluids, antibiotics and oxygen, with close clinical observation. But if people show signs of sepsis, the source of the leak must be removed within 3 to 18 hours, depending on the underlying condition and severity of infection. In less severe cases of sepsis associated with extraperitoneal rectal anastomotic leak, proximal defunctioning of the anastomosis with trans-anal or trans-peritoneal drainage may be considered. If there is radiological evidence that the anastomotic cavity is separate from the bowel, or if there are multiple sites of anastomotic leak, surgical intervention is needed.

Costs

2.6 The Endo-SPONGE kit costs £250.20 (excluding VAT) for a single sponge. The company estimates that complete treatment with Endo-SPONGE needs about 7 or 8 sponges. The drain bottle is bought separately, costing £20.90 per bottle (excluding VAT). Any glycerol-based hydrogel can be used and costs between £1 and £1.50 per tube.

For more details, see the website for Endo-SPONGE.

3 Evidence

NICE commissioned an external assessment centre (EAC) to review the evidence submitted by the company. This section summarises that review. Full details of all the evidence are in the project documents on the NICE website.

Clinical evidence

Relevant evidence comes from 20 observational studies, including 2 comparative studies

3.1 Twenty studies were relevant to the decision problem in the scope:

- 2 comparative studies (Schiffmann et al. 2019, Wasmann et al. 2019)
- 4 prospective studies (Jiménez Rodríguez et al. 2018, Milito et al. 2017, Rottoli et al. 2018, Strangio et al. 2015)
- 14 retrospective studies (Arezzo et al. 2015, Boschetti et al. 2018, Huisman et al. 2019, Katz et al. 2018, Keskin et al. 2015, Kuehn et al. 2016, Manta et al. 2016, Mussetto et al. 2017, Nerup et al. 2013, Riss et al. 2010, Riss et al. 2009, Srinivasamurthy et al. 2013, van Koperen et al. 2009, Weidenhagen et al. 2008).

  Three abstracts of non-comparative studies were also included (DiMitri et al. 2010, Martel et al. 2013, and McAuley et al. 2013). Three studies were in the UK.

The evidence is limited because of a heterogeneous population and inconsistent reported outcomes

3.2 The EAC considered the quality of the evidence for Endo-SPONGE to be very low. It found a high risk of bias because of the retrospective study design and small sample sizes (ranging from 3 to 34 people). It noted the clinical heterogeneity related to population characteristics and the definition of surgical site infections and success. It also found inconsistencies in how long Endo-SPONGE was in place and how many

times it was changed, the length and frequency of follow up and concurrent or additional treatments. This might reflect the clinical uncertainty and variation in practice when treating anastomotic leaks. The clinical experts suggested that there is no clearly defined care pathway, and treatment is based on several factors. These include the patient's overall condition, the anastomotic defect size and location, the indication for primary resection and the presence of a proximal stoma.

The evidence suggests that Endo-SPONGE could be an option to treat anastomotic leak

3.3 The available evidence suggests that Endo-SPONGE could be a treatment option for anastomotic leak. The success rate of cavity closure for Endo-SPONGE was about 85% and ranged from 40% to 100%, but the definition of success varied across studies. The stoma reversal rate after successful Endo-SPONGE treatment was about 77%, ranging from 38.5% to 92.3%. One study reported that 6 out of 8 patients would be willing to have Endo-SPONGE treatment again if needed.

Cost evidence

The company estimates that using Endo-SPONGE saves £2,419.50 per person in the first year

3.4 The company presented a de novo cost analysis with an Endo-SPONGE decision tree and a comparator decision tree. Each decision tree had 4 branches for different grades of anastomotic leak that may result in non-surgical or surgical treatment. The company noted that its cost model structure was based on the grades referred to in The Association of Coloproctology of Great Britain and Ireland's (ACPGBI) guidance on the prevention, diagnosis and management of colorectal anastomotic leakage. The results from the company model estimated that Endo-SPONGE was cost saving by £2,419.50 per person in the first year.

There are 3 possible scenarios proposed by the EAC to reflect clinical practice in the NHS

3.5 The EAC noted that there was no standard treatment pathway for managing anastomotic leak. The procedure cost varied by care setting (inpatient or outpatient), types of sedation (general or local anaesthetic) and whether or not it was combined with other interventions. The EAC proposed 3 scenarios based on available evidence and expert advice to explore the cost impact in clinical practice.

The EAC has revised key clinical parameters based on published data but also uses clinical parameters from the company submission

3.6 The EAC considered the company model structure, a 1-year cycle and a 10-year time horizon to be appropriate. It changed some of the clinical and cost parameters based on published studies and expert advice and focused on percutaneous drainage as a comparator. However, it acknowledged that there was uncertainty about the most appropriate clinical inputs to the model because there was no clearly defined care pathway. Because of the uncertainty in the clinical parameters, the EAC also used the company clinical values in the scenario analyses.

The cost impact of Endo-SPONGE varies depending on the scenarios and clinical parameters considered

3.7 The EAC noted that the cost impact of Endo-SPONGE compared with percutaneous drainage varied depending on the scenarios and clinical parameters considered. One scenario was based on Endo-SPONGE insertion under general anaesthesia in theatre, with subsequent sponge changes in an outpatient setting such as an endoscopy suite. Using the company's clinical parameters in the model, this scenario estimated that Endo-SPONGE would save £726 per person in the first year. Using the EAC's alternative clinical inputs in the model, Endo-SPONGE was estimated to have an additional cost of £1,141 per person in the first year. If both the insertion and replacement procedures were done in an operating theatre under general anaesthesia, then Endo-SPONGE was

cost incurring in the first year.

Endo-SPONGE may be cost saving in the long term

3.8 The EAC model estimated that Endo-SPONGE was cost saving over a 10-year time horizon. This was when the insertion procedure was done in an operating theatre and sponge changes were done in an endoscopy suite or day-case theatre under light sedation. Using the company's or EAC's clinical parameters, this results in cost savings of £2,829.30 and £68.20 per person at 10 years, respectively, compared with percutaneous drainage.

Additional analysis suggests Endo-SPONGE is cost saving compared with non-surgical treatments

3.9 In response to the committee discussion and consultation comments about the draft recommendations, the EAC did additional scenario analyses with alternative comparators. It acknowledged that the treatment pathway is complex and covers a heterogeneous patient population. Also, there is little data available on all the treatment options. The new analyses therefore included comparisons of Endo-SPONGE with non-surgical interventions including percutaneous drain, trans-anal drain and others that were not specified in the company submission. The results showed that Endo-SPONGE is cost saving by £298 per person over 1 year compared with a general non-surgical comparator.

4 Committee discussion

Clinical-effectiveness overview

Endo-SPONGE could treat anastomotic leak in a relatively small number of carefully selected patients

4.1 The clinical experts advised the committee that Endo-SPONGE is a 'niche' technology that is only suitable for treating anastomotic leak in a small selection of people. They explained that several key factors decided how anastomotic leak was treated. These included the anatomy of the anastomosis, the location and accessibility of the leak, and the patient's clinical condition (specifically sepsis severity and their general health status). The clinical experts explained that, in their clinical experience, Endo-SPONGE would be considered if:

- the anastomotic leak was in the low colorectal area
- the leak cavity was accessible through the anus
- the leak remained localised with no abdomen or peritoneum contamination
- the patient was clinically stable enough to have the procedure.

These anatomical and patient-related factors are likely to inform clinicians' decision making for treating anastomotic leaks in general. But, they do not give any insight about who will benefit most from the procedure. The committee noted that there is no evidence that clearly defines the criteria for patient selection but it was aware of The Association of Coloproctology of Great Britain and Ireland's (ACPGBI) guidance on the prevention, diagnosis and management of colorectal anastomotic leakage, which describes the treatment options. It concluded that it is important to understand which patient population might benefit from Endo-SPONGE. Collecting real-world evidence from its use in the NHS would help to develop this understanding.

The benefits of Endo-SPONGE are not consistently defined and

reported in the included studies

4.2 The definition of treatment success after Endo-SPONGE varied between studies. It was most frequently defined as closure of the leakage cavity to less than 1 cm, or complete granulation and resolution of the cavity. Also, the reported stoma reversal rates varied widely between studies. Experts advised this was an important outcome to measure the clinical effectiveness of Endo-SPONGE relative to other treatments. The committee agreed that there is some evidence that Endo-SPONGE may improve healing of an anastomotic leakage cavity and increase stoma reversal. However, the evidence is low quality with considerable variation in important clinical endpoints between studies.

More evidence is needed to assess how acceptable Endo-SPONGE is to patients

4.3 The clinical experts advised that Endo-SPONGE is likely to improve patients' quality of life. This is because it offers the possibility of stoma reversal and restoration of bowel function. However, only 2 studies reported patient outcomes that included patient acceptability (Riss et al. 2009) and functional bowel recovery (Huismann et al. 2019). In the clinical experts' experience, pain and discomfort are the 2 most reported adverse symptoms. Endo-SPONGE treatment is stopped because of pain in a small number of their patients. The committee concluded that there is uncertainty about the tolerability of Endo-SPONGE in the wider population. More real-world evidence is needed to understand the effect of Endo-SPONGE on health-related quality of life and residual bowel function.

National databases could improve the evidence for Endo-SPONGE

4.4 The committee concluded that the overall quality of the current evidence is low with a high risk of bias. This is because of the retrospective design of most studies, limited comparators and small sample sizes. The clinical experts explained that the patient groups for whom Endo-SPONGE might be suitable are small and need to be carefully selected. So, it is unlikely that it would be practical to do a randomised controlled trial. They suggested that using a national database or clinical registry could help

evaluate the clinical benefits of Endo-SPONGE and define the most appropriate patient population. The committee agreed that further research with observational and real-world data would strengthen the evidence.

NHS considerations overview

Managing anastomotic leak is challenging without a clearly defined care pathway

4.5 The clinical experts noted that the rate of anastomotic leak after colorectal surgery in the UK is relatively low (reported to be between 4% and 12%). The clinical experts recognised that there have been improvements in techniques for colorectal surgery, such as stapling and robotics. This could help reduce the incidence of anastomotic leak. However, it remains a serious complication after colorectal surgery in some people. The clinical experts explained that the treatment care pathway for people with anastomotic leak varies across the NHS. It depends on local clinicians' experience and the facilities and resources available. The committee concluded that managing anastomotic leak is made more challenging because there is not a clearly defined care pathway.

Training

The Endo-SPONGE procedure is easy to learn but specific training is needed

4.6 The clinical experts advised that specific training is needed for the Endo-SPONGE procedure but it is easy to learn. The company provides free on-site training. The main challenge of getting clinical experience for this technology is the small number of patients for whom it can be used. A clinical expert explained that, in their organisation, Endo-SPONGE may only be suitable for about 4 to 5 people per year. Support from the company in the form of training such as simulation training may help to resolve this issue. The committee concluded that training is needed to do

the Endo-SPONGE procedure.

Cost modelling overview

Comparing Endo-SPONGE and percutaneous drainage may not be appropriate because they are likely to be used in different clinical scenarios

4.7 The cost modelling done by the external assessment centre (EAC) compared Endo-SPONGE with percutaneous drainage for treating anastomotic leak. However, the clinical experts advised that this comparison may not be appropriate. They explained that alternative comparators such as the placement of a trans-rectal or trans-anal drain may also be used for leaks after a low rectal anastomosis. People having these different treatments are likely to have different clinical and anatomical characteristics. The committee concluded from the consultation comments and expert advice that comparators for Endo-SPONGE in the care pathway may vary depending on patient selection, and percutaneous drainage is likely to be used in a different clinical scenario.

The cost consequences of Endo-SPONGE are uncertain but it is likely to be cost saving.

4.8 There were 3 clinical scenarios modelled by the EAC. Of these, the clinical experts agreed on a scenario that best reflected current clinical practice. This was the one in which the first assessment and Endo-SPONGE insertion was done in an operating theatre under general anaesthesia, with subsequent sponge changes done in an outpatient setting under local anaesthesia or light sedation. The clinical experts also added that, in their experience, endoscopy is not necessarily needed to insert Endo-SPONGE, because of how close the leakage cavities are to the anal verge. The committee noted the EAC's additional cost modelling used other non-surgical comparators. This showed a cost saving of £298 per person over 1 year and £2,230 per person over 10 years. The committee noted that the main cost drivers were reoperation rates and rates of avoiding costs associated with a permanent stoma. However, the

studies reported a wide range of values for these important clinical parameters. The committee noted that comparative cost modelling is therefore difficult with the available evidence. It concluded that there are significant uncertainties about the cost consequences of using Endo-SPONGE. Collecting real-world data would be helpful to inform uncertainties around patient selection, Endo-SPONGE's place in the care pathway, and clinical and cost outcomes.

Further research

Endo-SPONGE shows promise and data is needed on using Endo-SPONGE in clinical practice

4.9 The committee concluded that Endo-SPONGE shows promise for treating anastomotic leak and further studies will help define the clinical and cost benefits. However, doing comparative research is likely to be challenging because of the small number of people with low colorectal anastomotic leak in the NHS each year, and the lack of a clearly defined care pathway. The committee was advised that real-world data, such as from a national registry, would be useful. It could help resolve uncertainties around the optimal use of this technology in clinical practice, including:

- the selection criteria for people who could benefit from Endo-SPONGE
- the comparative rate of stoma reversal and bowel function recovery using Endo-SPONGE compared with other treatments
- patient-reported outcome measures such as health-related quality of life
- the cost of Endo-SPONGE compared with other treatments for anastomotic leak.

A feasibility study shows that the best approach would be to establish a new national anastomotic leak registry

4.10 NICE commissioned an independent feasibility assessment to consider the potential for further data collection to address the uncertainties in the clinical evidence identified by the committee. The feasibility

assessment highlighted that the best approach would be to establish a new national anastomotic leak registry to collect data on all patients with the condition, not just those having Endo-SPONGE treatment. There are significant cost and resource implications to establish such an NHS-wide register, to collect patient data and produce the required analyses.

5 Committee members and NICE project team

Committee members

This topic was considered by NICE's medical technologies 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 the medical technologies advisory committee, 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 health technology assessment analysts (who act as technical leads for the topic), a health technology assessment adviser and a project manager.

YingYing Wang
Health technology assessment analyst

Bernice Dillon
Health technology assessment adviser

Victoria Fitton
Project manager

ISBN: 978-1-4731-3923-7

Accreditation