NICE National Institute for Health and Care Excellence

NICE guidance

Memokath-051 stent for ureteric obstruction

Medical technologies guidance

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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. However, 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.

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.

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

1 Recommendations

1.1 The case for adopting Memokath-051 for treating ureteric obstruction is partially supported by the evidence. The evidence is limited but suggests that in selected cases, Memokath-051 is effective at relieving ureteric obstruction and improving quality of life. When inserted by trained clinicians (see section 4.8) and in appropriate patients (see section 1.2), Memokath-051 is associated with equivalent success rates and a better patient experience compared with double-J stents. Using Memokath-051 may also reduce the number of stent replacements needed compared with using double-J stents.

1.2 Memokath-051 stents should be considered as an option in patients with:

- malignant ureteric obstruction and anticipated medium- or long-term survival after adjunctive therapy
- benign ureteric obstruction who cannot have or do not want reconstructive surgery or
- ureteric obstruction of any kind who cannot have or do not want a double-J stent, or for whom repeat procedures are a particularly high risk.

1.3 The cost consequences of adopting Memokath-051 are uncertain. However, when used in appropriate patients and by clinicians trained in its use, it may be cost neutral or cost saving compared with standard treatment. Potential cost savings mainly come from fewer repeat procedures with Memokath-051.

2 The technology

Description of the technology

2.1 Memokath-051 (PNN Medical) is a thermo-expandable, nickel-titanium alloy ureteric stent. It is intended as an alternative to conventional ureteric stents for people with malignant or benign ureteric obstruction. The nickel-titanium alloy has a shape memory effect which is designed to allow the stent to be more easily inserted and anchored in position. A spiral coil design aims to prevent endothelial ingrowth of the tumour or stricture into the stent so that it can be easily removed. Four different versions of Memokath-051 stents are available (single or double cone, for either antegrade or retrograde insertion), each in several different lengths. Memokath-051 can be used to treat obstructions elsewhere in the urinary tract, but this is outside the scope of this evaluation.

2.2 The cost of Memokath-051 used in the company's submission is £1,690 (excluding VAT). This includes the Memokath-051 stent, a guidewire and a dilator-insertion sheath.

2.3 The company claims in the case for adoption that Memokath-051 is a safe, simple and reliable ureteric stent with several advantages over other stents:

- It is better tolerated by the patient, with fewer stent-related symptoms and complications.
- It avoids the need for stent replacement every 6 months, which saves costs.
- It restores dignity and improves quality of life.
- It reduces the risk of tissue ingrowth.
- It can easily be removed with no side effects.
- It uses theatre time more efficiently by avoiding the need for major surgery.

Current management

2.4 Ureteric obstruction must be treated quickly to avoid the development of obstructive renal failure. Obstructions can be treated by stenting the ureter, creating a nephrostomy or through reconstructive surgery. The NICE guideline

on acute kidney injury states that people with upper urinary tract obstruction should be referred to a urologist. If appropriate, nephrostomy or stenting should be done as soon as possible (at least within 12 hours of diagnosis).

2.5 NICE has produced more specific guidance for malignant ureteric obstruction as a result of prostate or bladder cancer. The NICE guideline on prostate cancer recommends decompression of the upper urinary tract by nephrostomy or inserting a double-J stent. The NICE guideline on bladder cancer recommends nephrostomy or retrograde stenting (if technically feasible) for people with locally advanced or metastatic bladder cancer.

3 Evidence

Summary of clinical evidence

3.1 The evidence for Memokath-051 comprises 16 studies that met the inclusion criteria outlined in the scope, all of which included only adults with benign or malignant ureteric obstruction. Six of these were comparative observational studies: 2 full papers, 3 conference abstracts and 1 clinical trial record and abstract. The other 10 studies were single-arm observational studies published as full texts. For full details of the clinical evidence see section 3 of the assessment report.

Main points from the EAC's analysis of the clinical evidence

3.2 The external assessment centre (EAC) considered all of the comparative studies and 8 of the 10 single-arm studies to provide results which were relevant to the decision problem. The other 2 single-arm studies (Bach et al. 2013 and Boyvat et al. 2005) had less relevance to the decision problem because they did not have acceptable levels of internal or external validity, so they were not included in the analysis.

3.3 The quality of reporting across all the studies was generally poor. None of the studies provided adequate details on patient characteristics, stent insertion procedures, follow-up, statistical analyses and uncertainty around the results. Migration rates and clinical success were the most commonly reported outcomes but definitions of clinical success varied, so statistical pooling could not be done.

3.4 The 6 comparative studies compared Memokath-051 with:

- Allium stents (Bolton et al. 2015)
- UVENTA stents (Kim et al. 2014)
- double-J stents (Granberg et al. 2010, Maan et al. 2010)
- Resonance stents (Nam et al. 2015)
- ileal ureteral replacement surgery (Akbarov et al. 2017).

- Memokath-051 stents had lower clinical success rates compared with Allium stents, UVENTA stents and ileal ureteral replacement surgery, but was comparable to double-J and Resonance stents. In a pooled analysis of migration rates, Memokath-051 stents had the highest rates compared with Allium, double-J and UVENTA stents. However, the EAC advised that the results should be treated with caution, because the rates for the comparators are informed by fewer studies and patients than those for Memokath-051.

3.5 None of the studies provided comparative data for stent removal and replacement. A pooled analysis of the Memokath-051 treatment arms showed that 16.0% were removed and replaced, 17.7% migrated and 6.3% were encrusted. There was not enough evidence for a subgroup analysis of patients who could not have surgery or antegrade or retrograde insertion. Clinical success rates for Memokath-051 ranged from 50% to 64% in people with benign ureteric obstruction and from 33% to 100% in people with malignant ureteric obstruction. In Kim et al. (2014), Memokath-051 had similar clinical success rates to UVENTA in the benign population but statistically significantly inferior success rates to UVENTA in the malignant population.

3.6 The EAC concluded that the evidence for Memokath-051 came mainly from small, poorly reported observational studies. It considered that only 2 comparative studies (Maan et al. 2010 and Kim et al. 2014) and 1 single-arm study (Zaman et al. 2011) had acceptable internal and external validity.

Summary of economic evidence

3.7 The company submitted 3 economic studies, 2 of which were excluded by the EAC. The EAC identified 2 other relevant studies (Gonzalez et al. 2011 and Zaman et al. 2012). It considered that although the studies were poorly reported and in a heterogeneous group of patients, the results indicated that Memokath-051 is likely to be cost saving compared with double-J stents.

3.8 The model submitted by the company was based on an unpublished analysis comparing Memokath-051 with double-J stents. The EAC replicated the company's model, making it fully executable, and modified it to improve its usefulness for decision-making. The EAC's main changes included:

- extending the time horizon to 5 years

- including reconstructive surgery and other metallic stents as comparators
- adding the ability to report a break-even time point between Memokath-051 and the comparators
- including the risk of urinary tract infections
- adding scenario analyses to model the risk of unplanned Memokath-051 replacement in 4 scenarios
- introducing deterministic sensitivity analyses.

The cost modelling includes planned replacement of double-J stents after 6 months and no planned replacement of Memokath-051 over the 5-year time horizon. The EAC model also included a monthly risk of unplanned replacement for both technologies based on clinical data. Further details are in section 4.2.2 and 4.5 of the assessment report.

EAC's analysis of the economic evidence

3.9 The company's base-case results showed that compared with double-J stents, using Memokath-051 could save £4,156 per patient over 2.5 years. After the EAC revisions to the model, this saving fell to £1,619 per patient over 5 years.

3.10 Compared with reconstructive surgery, Memokath-051 stents are only cost saving if no planned replacement is needed. The incremental cost per patient after 5 years ranged from £467 to −£1,009, depending on the extrapolation of unplanned replacements.

3.11 Planned stent replacement is the main cost driver for Memokath-051 compared with other metallic stents:

- Compared with UVENTA and Allium stents, Memokath-051 stents are cost neutral in the worst case but potentially cost saving with more positive assumptions.
- Compared with Resonance stents, Memokath-051 stents are cost saving after 12 months.

The EAC advised that the comparisons with Allium and Resonance stents should be interpreted with caution, because they are based on assumptions instead of

- comparative clinical data.

3.12 The EAC's analysis suggested that Memokath-051 stents may be a plausible cost-saving treatment option for ureteric obstruction in people who cannot have reconstructive surgery and who are expected to need a ureteral stent for at least 30 months.

4 Committee discussion

Clinical effectiveness

4.1 Having noted the external assessment centre's (EAC) comments on the limited evidence, the committee concluded that there was sufficient evidence to partially support the claimed patient benefits of Memokath-051 compared with double-J stents. It considered, however, that the claimed patient benefits compared with other metallic stents were not fully substantiated by the limited evidence available. The clinical experts commented that although the level of evidence was disappointing for a technology that has been commercially available for over 15 years, possible explanations include both the relatively rare circumstances under which Memokath-051 is used and the technically demanding nature of its insertion.

Care pathway

4.2 The clinical experts explained that double-J stents are the most commonly used stent for ureteric obstruction. They stated that the primary objective for patients who present with acute ureteric obstruction is to stabilise the patient by relieving the obstruction and treating any infection present. This is usually done by first creating a nephrostomy or inserting a double-J stent (or sometimes both). Once the patient is stable, a decision can be made about longer-term management. Options that are routinely considered include reconstructive surgery or inserting a metallic stent (such as Memokath-051). Important factors that influence this decision include the nature of the underlying disease process (benign or malignant) and the patient prognosis. The clinical experts emphasised the need for careful patient selection for Memokath-051, and the importance of the stent being inserted by specialists with sufficient expertise and experience of the different technologies and procedures.

Patient selection with benign ureteric obstruction

4.3 The clinical experts explained that there is a heterogeneous group of benign conditions that may present with ureteric obstruction, for which reconstructive surgery is considered the standard of care. However, they advised that surgery may be unsuitable for some patients because of procedural risk or other co-morbidities, and that some patients may decline surgery. In these circumstances, inserting a metallic stent (such as Memokath-051) may be a reasonable

alternative. The committee heard that Memokath-051 stents should not be used in patients with bladder stones because of an increased risk of stent encrustation, or in patients with pelvi-ureteric junction obstruction because of an increased risk of stent migration. One expert provided anecdotal evidence that they had successfully used Memokath-051 stents in patients with vascular ureteral strictures. The committee concluded that Memokath-051 should only be considered as a treatment option in patients with benign ureteric obstruction who cannot have or do not want reconstructive surgery.

Patient selection with malignant ureteric obstruction

4.4 Some ureteric obstructions result from malignancy; treatments for such malignancies may result in medium- or even sometimes long-term survival. The clinical experts explained that in these cases, the life expectancy of the patient is often the most important factor in determining how long stent treatment will be needed. The committee recalled that the evidence suggests that using Memokath-051 reduces the need for stent replacements compared with double-J stents, so that its use may be of particular value in patients with malignant ureteric obstruction with medium- or long-term life expectancy after adjunctive treatment. The committee also concluded that Memokath-051 may be a useful option for people who cannot have a double-J stent, or for people for whom repeat procedures are a particularly high risk.

Quality of life benefits

4.5 The committee concluded from the published evidence and expert advice that Memokath-051 is usually well tolerated, and associated with fewer adverse symptoms than double-J stents.

Complications

4.6 Stent migration is the most common complication with Memokath-051. The clinical experts explained that this may be for several reasons, including: physical changes in the ureter after inserting the stent, stents placed too close to the pelvi-ureteric junction, or the use of a stent that is too long. They suggested that migration rates may be reduced with Memokath-051 through choosing the right stent and its being inserted only by trained and experienced clinicians.

Future data collection

4.7 Given the limited evidence available, the committee concluded that it would be beneficial for clinicians to routinely collect clinical and procedural outcome data on the use of ureteric stents including Memokath-051. The committee proposed that data should ideally be collected in collaboration with a national professional society such as the British Association of Urological Surgeons.

NHS and system impact considerations

4.8 The committee considered that the decision to use Memokath-051 should only be made by a multidisciplinary team that includes endo-urologists, interventional radiologists and, if possible, reconstructive surgeons.

4.9 The clinical experts explained that clinicians' training and experience of inserting stents were important factors in determining success when using Memokath-051. They stated that there are important technical challenges and decisions, such as ensuring that the correct stent size is used, ensuring that the ureter is properly dilated, and ensuring the best stent placement possible. The company confirmed that it includes the availability of training, workshops and proctorships in the acquisition cost of Memokath-051. The clinical experts confirmed that the company's training had been helpful, but they felt that there was a need to further formalise this training process (such as defining the number of stents inserted before achieving competency).

Cost savings

4.10 The committee considered that any cost savings were uncertain because of the lack of good quality supportive evidence, the heterogeneous patient group and the complicated care pathway. It considered the EAC's revised cost model to provide more realistic results than the company's model. The clinical experts explained that double-J stents may sometimes need to be replaced after only a few weeks, but the model assumed double-J stent replacement at 6 months. Consequently, the estimated cost savings from using Memokath-051 compared with double-J stents may be conservative.

5 Conclusion

5.1 The committee concluded that when inserted by trained clinicians and in appropriate patients, Memokath-051 is more effective and most likely to be cost neutral or cost saving compared with double-J stents.

6 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 health technology analysts (who act as technical leads for the topic) and a technical adviser or senior technical analyst.

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Accreditation