Cost Impact of the Porcine Urinary Bladder Matrix in Patients with Diabetic Foot Ulcer in the United Kingdom

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Objectives

The decellularized extracellular matrix (ECM) scaffold derived from the porcine urinary bladder is expected to improve wound healing; however, very few analyses assess its clinical benefit compared to costs. The objective was to determine the cost consequences of porcine urinary bladder matrix in addition to routine management (RM) compared with RM alone for the management of recalcitrant, neuropathdiabetic diabetic foot ulcers (DFUs) in the United Kingdom (UK) from the perspective of the healthcare payer.

Methods

Model structure and patient population

A decision-analytic model was constructed to estimate the cost impact of urinary bladder matrix (Cytal, Integra LifeSciences) in addition to routine management compared to routine management alone.

The analysis was based on the results of the randomized controlled trial of Alvarez 2017.

The model included patients with chronic and non-healing diabetic foot ulcers for more than two months, Grade I-A according to the University of Texas Wound Classification System, with a mean ulcer size of 12.85 cm2 and a mean ulcer age of 5.2 months. DFU patients could receive either routine management according to the common clinical practice in the UK or the application of urinary bladder matrix in addition to routine management.

According to the RCT results, the use of urinary bladder matrix leads to faster wound healing in the first several months of care and a lower rate of recurrence in one year. Faster healing and a lower rate of recurrence have the potential to reduce the cost of care for patients with diabetic foot ulcers.

Clinical inputs

Two clinical outcomes were considered in the model: time to healing of the original wound and incidence of ulcer recurrence at one year (Table 1).

There was a statistically significant difference in the mean time to healing (days) between the urinary bladder matrix and routine management group (p=0.031): 62 days vs 93 days. This was transformed into time to heal in weeks: 15.5 weeks in the urinary bladder matrix group and 23.3 weeks in a routine management group.

As a consequence of better and faster healing, the incidence of wound recurrence was lower in the urinary bladder matrix group in one year, 10% vs 50% in the routine management group.

For recurrence of wounds at one year, the healing time was assumed to be the same as the wound healing in the routine management group for the original wound (23.3 weeks on average). The same healing time was applied to both groups, as only routine management of the wounds was considered for recurrent wounds.

Table 1. Clinical inputs

INPUT	URINARY BLADDER MATRIX + ROUTINE MANAGEMENT	ROUTINE MANAGEMENT	SOURCE
Time to wound healing for the original wound, weeks	15.5	23.3	Alvarez 2017
Incidence of wound recurrence at one year	10%	50%	Alvarez 2017
Time to wound healing for the recurrence of the wound, weeks	23.3	23.3	Assumption, based on Alvarez 2017

Cost inputs

Only direct medical costs were considered, including the cost of one-time surgical debridement, urinary bladder matrix, and the cost of regular hospital and ambulatory care, including dressings and offloading devices (Table 2).

The cost of urinary bladder matrix in the UK was obtained from the manufacturer (Integra LifeSciences). The cost of the surgical debridement / urinary bladder matrix placement procedure was obtained from the NHS Reference Cost methodology in the UK.

This cost was applied to both groups at the beginning of the initial treatment of the wound.

The practice of applying the urinary bladder matrix varies in the US and in Europe. While in the US (and as in the study of Alvarez 2017), the matrix is applied weekly until the wound is healed, in Europe, the matrix is applied only once. The effectiveness of one-time or several applications of urinary bladder matrix is supported by a limited but emerging literature (Alenizi 2024, Grussu 2024, Jeffery 2024, Negra 2025). In the cost analysis, only a one-time application of urinary bladder matrix was considered to reflect current clinical practice in Europe.

The weekly cost included only direct medical costs associated with routine DFU care (excluding societal expenses). The costs associated with inpatient, outpatient, community, and primary care services were incorporated to reflect the clinical management practice of less severe DFUs. The costs were obtained from the UK study of Kerr 2025.

A cost analysis was performed. All values were presented in 2024-25 British pounds.

The analysis was performed from the perspective of the UK healthcare payer. The time horizon in the cost analysis was 1.5 years.

Table 2. Cost inputs

INPUT	VALUE, £	SOURCE
Average cost of urinary bladder matrix per patient	108.3	Integra Lifesciences [data on file], Alvarez 2017 for the size of the wound
Cost of surgical debridement and urinary bladder matrix one-time application procedure	1,584	NHS Reference Cost (HRG JC41Z)
Cost of weekly management of a diabetic foot ulcer	171.35	NHS Reference Cost (HRG KB03C–D), Kerr 2025

Results

The use of urinary bladder matrix in addition to routine management was associated with lower total cost at 1.5 years in comparison with routine management alone in patients with diabetic foot ulcers (Figure 1 & 2).

The total cost of care per patient treated with urinary bladder matrix was £4,747 in comparison with £7,573 per patient receiving routine management, resulting in the overall average cost saving of £2,825 per patient when treatment was conducted with urinary bladder matrix and routine management. The cost of management of the original wound was £4,384 and £5,576, and the cost of management of the recurrent wound was £399 and £1,996 in the urinary bladder matrix and routine management groups, respectively.

Figure 1. Base-case results

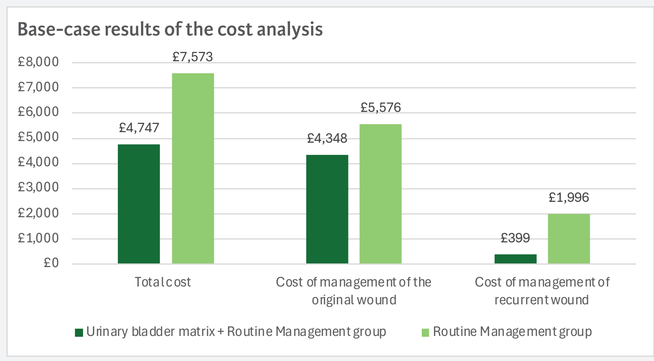
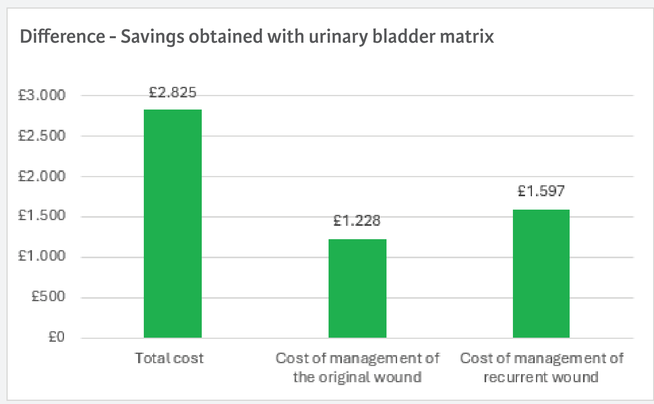


Figure 2. Savings obtained



Conclusions

Whilst the management of patients with difficult-to-heal diabetic foot ulcers with urinary bladder matrix can increase an upfront cost, the benefits are counterbalanced, and the total cost of care is reduced for the UK healthcare system. Cost savings are driven by faster healing of original wounds and a lower recurrence rate using urinary bladder matrix.

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