

COST EFFECTIVENESS OF DERMABOND™ PRINEO™ SKIN CLOSURE SYSTEM IN HIP AND KNEE ARTHROPLASTY IN TURKEY

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Introduction

- Wound complications are the major reasons for morbidity after hip and knee arthroplasties. Surgery site infections have been observed in 19% of knee and 28% of hip arthroplasty. These infections lead to morbidity, mortality, longer stays in hospital, a lower quality of life and re-hospitalization (Patel et al, 2016; Whitehouse et al, 2002).
- The Dermabond™ Prineo™ Skin Closure System has been created to combine 2-octyl-cyanoacrylate skin adhesive (Dermabond™) with a self adhering mesh to close long skin incisions more safely and to avoid surgery site infections.

Objective

- To assess the cost effectiveness of the Dermabond™ Prineo™ Skin Closure System in hip and knee arthroplasty in Turkey.

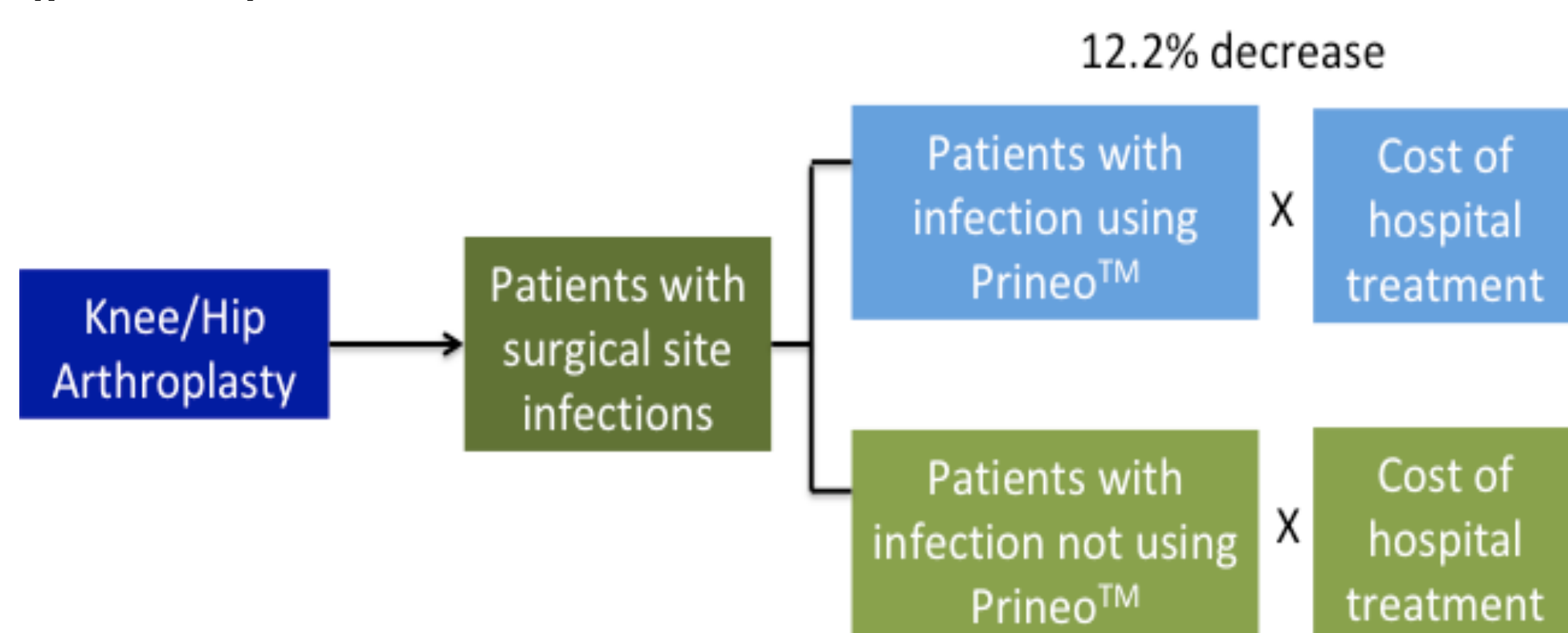
Methods

- A simple decision making model was used to assess the cost-effectiveness of Prineo™ (Figure 1). The use of Prineo was compared with non-use as there were no alternatives for comparison. The Incremental Cost Effectiveness Ratio (ICER) was calculated as additional cost per avoided infection.
- All analyses were conducted from the perspective of Turkey's Social Security Institution (SGK). Cost data, regarding the type and frequency of resources used in hospital treatment of surgery infection and prosthesis infection caused by surgery infection for both arthroplasties were obtained from expert views. Epidemiological data and complication rates were obtained from the literature and expert views. The data obtained for 2016 was extrapolated to 2018 using the population increase rate. The number of knee and hip arthroplasties in Turkey is taken from literature as 60,328 and 24,462 respectively (Hekimoğlu, 2016). The percentage reduction in infection (12.2%) was taken from the literature (Johnston, Sutton, 2017).
- Hip and knee arthroplasties are reimbursed under the package payment system of the SGK and the payments are 1,898 TRY for knee and 2,550 TRY for hip arthroplasty (Attachment -2/C of the Health Implementation Guide).

Results

- The total costs per patient with Prineo™ were calculated as 3,100 TRY for hip and 2,448 TRY for knee arthroplasty. The total number of arthroplasty patients for 2018 was estimated as 93,567. Of these patients, 17,742 developed an infection when Prineo™ was used whereas 20,207 patients had infection when Prineo™ was not used. In total, 2,465 infections were avoided with the use of Prineo™. The total annual cost of infection was 39,954,325 TRY with Prineo™ and 34,392,143 TRY without Prineo™. The ICER was calculated as 2,256 TRY per avoided infection.

Figure 1: Simple Decision Model



References

- Hekimoğlu, C.H., 'Türkiye'de Sağlık Hizmeti İlişkili Enfeksiyonlar Sürveyans Verileri 2016', Türkiye Halk Sağlığı Kurumu.
- Johnston, S.; Sutton, N. (2017), 'Comparison of economic and clinical outcomes between Dermabond Prineo skin closure system and skin staples in patients undergoing knee replacement in real world clinical practice', 22nd Annual International Meeting ISPOR.
- Patel, H., et al, (2016), 'Burden of Surgical Site Infections Associated with Arthroplasty and the Contribution of Staphylococcus aureus' Surg Infect (Larchmt) 17(1): 78-88.
- Whitehouse, J.D., et al, (2002), 'The impact of surgical-site infections following orthopedic surgery at a community hospital and a university hospital: adverse quality of life, excess length of stay, and extra cost', Infect Control Hosp Epidemiology, 23(4): 183-189.

Results

Table 1: Epidemiologic and Patient Data

	2016	2017	2018
Total Population	79,814,871	80,892,372	81,984,419
Number of Hip Arthroplasty	22,168	24,462	26,994
Infection Rate after Hip Arthroplasty	28%	28%	28%
No of Patients with Infection after Hip Arthroplasty	6,207	6,849	7,558
Decrease in Hospitalization with Prineo™	12.2%	12.2%	12.2%
Number of Hospitalized Patients after Prineo™	5,450	6,014	6,636
Number of Knee Arthroplasty	54,670	60,328	66,572
Infection Rate after Knee Arthroplasty	19%	19%	19%
No of Patients with Infection Treatment after Knee Arthroplasty	10,387	11,462	12,649
Decrease in Hospitalization with Prineo™	12.2%	12.2%	12.2%
Number of Hospitalized Patients after Prineo™	9,120	10,064	11,106
Estimated no of Patients using Prineo™	0	0	2,000

Table 2: Total Cost of Operations with Dermabond™ Prineo™

Total Public Cost	TRY
Knee Arthroplasty	2.448
Hip Arthroplasty	3.100

Table 3: Cost of Treatment Without Dermabond™ Prineo™

	2017 (TRY)	2018 (TRY)
Hip Arthroplasty Cost of Infection	11,061,303	12,206,148
Knee Arthroplasty Cost of Infection	20,105,116	22,185,995
Total Cost of Hospitalization Due to Infection	31,166,419	34,392,143

Table 4: Cost of Treatment With Dermabond™ Prineo™

	2017 (TRY)	2018 (TRY)
Hip Arthroplasty Cost of Infection	9,711,824	10,716,998
Knee Arthroplasty Cost of Infection	17,652,292	19,479,304
Total Cost of Hospitalization Due to Infection	27,364,116	39,954,325
Cost of Dermabond™ Prineo™	0,00	9,758,024

Table 5: Cost-Effectiveness Parameters

	Number of Patients (2018)	Cost of Infection with Prineo™ (TRY)	Total Cost (TRY)
With Dermabond™ Prineo™	93,567 Number of Patients with Infection 17,742	39,954,325 Number of Avoided Infections with Prineo™ 2,465	39,954,325
Without Dermabond™ Prineo™	93,567 Number of Patients with Infection 20,207	34,392,143 Number of Avoided Infections 0	34,392,143

Table 6: Incremental Cost-Effectiveness Ratio

Treatment	No of Patients with Infection	Number of Avoided Infections	Total Cost (TRY)	Incremental Cost (TRY)	ICER
With Dermabond™ Prineo™	17,742	2,465	39,954,325	5,562,182	2,256
Without Dermabond™ Prineo™	20,207		34,392,143		

Conclusion

- Turkey does not have a threshold for cost-effectiveness analysis decisions and generally the WHO recommendations are used for decision-making. Accordingly, the Dermabond™ Prineo™ Skin Closure System is a very cost-effective option for hip and knee arthroplasties in Turkey.