



Cost-effectiveness Analysis of Intra-articular Injection of Plasma Rich in Growth Factors for Knee Osteoarthritis in the Aging Population Who Failed Conservative Treatment

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Purpose: As Thailand moves toward an aging society in the future, knee osteoarthritis is becoming an important public-health problem. This study aimed to perform a cost-effectiveness analysis (CEA) of plasma rich in growth factors (PRGF) injection compared with standard treatment using non-steroidal anti-inflammatory drugs (NSAIDs) and celecoxib for knee osteoarthritis in older Thai patients and to study the incidence of total knee arthroplasty (TKA) surgery in the group treated with PRGF after conservative treatment had failed.

Methods: This retrospective single-cohort study included Thai patients (age, ≥55 years) with Kellgren–Lawrence grade II–IV knee osteoarthritis who did not respond to standard conservative treatment and required TKA surgery who were treated between January 2022 and December 2024 at Priest Hospital. The Western Ontario and McMaster Universities Osteoarthritis Index score (obtained at baseline, 1 month, 6 month, and 12 months), which was used to measure clinical outcomes, was converted into a utility score using the Barton mapping algorithm. The cost analysis used the payer perspective, calculated from direct medical costs, which included physician examination fees, radiology fees, procedure fees, the cost of treating gastrointestinal complications, and the cost of TKA surgery.

Results: The mean utility score increased from 0.5957 at baseline to 0.7252 at month 6 (utility gain, 0.1295), which was the period of peak effectiveness, before decreasing to 0.6660 at month 12. The total cost was 6,000 Thai baht (THB) for a PRGF injection, whereas those of NSAIDs and celecoxib were 3,762.64 and 7,719.78 THB, respectively. The average cost of TKA surgery in Priest Hospital was 105,213.30 THB/case. During the 12-month follow-up, a low rate of surgical conversion was observed, with only 19 (9.64%) of 197 patients undergoing TKA. At month 6, PRGF had an incremental cost-effectiveness ratio (ICER) of 41,059.01 THB per 6-month utility gain relative to NSAIDs. Compared with celecoxib, PRGF had a negative ICER (–36,212.45 THB per 6-month utility gain), showing an economically dominant status by providing greater utility gains at a lower total direct cost.

Conclusions: PRGF was associated with favorable short-term economic outcomes compared with externally derived estimates for conventional NSAIDs and celecoxib.

Keywords: plasma rich in growth factors (PRGF), knee osteoarthritis with failed conservative treatment, cost-effectiveness analysis

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There are currently more than 6 million patients with knee osteoarthritis in Thailand, accounting for approximately 9% of the total population ⁽¹⁾. Among the elderly older than 60 years, the incidence is as high as 34%–45%, and the condition is increasingly being found in middle-aged people as well ⁽²⁾. A study that estimated the cost of illness from a societal perspective found an average cost of $6,936.96 \pm 6,525.29$ THB/year, whereas the direct cost of anti-inflammatory medication and total knee arthroplasty (TKA) surgery under the National Health Security scheme averaged $80,561 \pm 24,102$ THB/case (median, 76,263 THB/case) ⁽³⁾. These data reflect that knee osteoarthritis is an important public-health problem and that it will become more severe as Thai society moves toward an aging society in the future.

Non-surgical treatments, such as physical therapy, weight control, and oral analgesics, often cannot fully relieve symptoms ⁽⁴⁾. In patients who do not respond to such treatment, intra-articular injection is regarded as an effective non-surgical option. Platelet-rich plasma (PRP) injection, which is classified as a type of biologic therapy, has attracted greatly increased interest in recent years⁽⁵⁾.

In Thailand, an innovation using a triple-spin preparation technique to obtain high-quality, concentrated plasma rich in growth factors (PRGF) has been developed by Turajane et al. in 2011 ⁽⁶⁾. Unlike conventional PRP, which often contains pro-inflammatory leukocytes and erythrocytes from non-standardized preparations, PRGF uses an advanced, standardized triple-spin centrifugation protocol designed to selectively isolate regenerative biomolecules while depleting undesirable cellular fractions. Specifically, the biological profile of PRGF is characterized by three synergistic components: first, a functional, high-density platelet concentration that delivers essential growth factors; second, selective retention of immunomodulatory lymphocytes, which counteracts local inflammation while eliminating destructive granulocytes; third, a natural fibrin scaffold of complex plasma proteins that stabilizes bioactive molecules and facilitates their sustained release. Consequently, this innovation is considered an option for intra-articular injection that can reduce pain, restore cartilage, and

reduce inflammation in the knee joint, with high safety, good treatment outcomes, and a low complication rate ^(7, 8).

Vilchez-Cavazos et al. conducted a meta-analysis and found that patients with late-stage knee osteoarthritis benefited from PRP treatment, both in terms of reduced pain and improved knee function ⁽⁹⁾. Meanwhile, Raeissadat et al. found that PRP injection was more cost-effective than intra-articular hyaluronic acid and ozone for patients with mild to moderate knee osteoarthritis⁽¹⁰⁾. Turajane and colleagues studied and followed up patients treated with PRGF at 24–36 months and found that it reduced the incidence of surgery by 80.18% ^(11, 12).

Objective

This study aimed to perform a cost-effectiveness analysis (CEA) of PRGF treatment compared with standard treatment using non-steroidal anti-inflammatory drugs (NSAIDs) and celecoxib in Thai patients aged ≥ 55 years with knee osteoarthritis and to evaluate the rate of surgical conversion within the PRGF cohort to inform the CEA of this intervention within the context of Thailand.

METHODS

This retrospective, quantitative, single-cohort study evaluated the medical records of Thai patients diagnosed with knee osteoarthritis of all stages who were treated between January 2022 and December 2024. The sample comprised Buddhist monks treated at Priest Hospital who were ≥ 55 years and diagnosed with Kellgren–Lawrence (KL) grade II–IV knee osteoarthritis. Patients were followed up for 12 months.

An economic evaluation was performed using a CEA from the healthcare provider's perspective ⁽¹³⁾. The clinical outcomes were accessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score, collected at baseline and at 1 month, 6 months, and 12 months. To convert disease-specific health outcomes into health state utility values, the WOMAC scores were mapped to predicted EuroQol 5-Dimension utility scores using the

mapping algorithm published by Barton et al.⁽¹⁴⁾

A total of 197 patients who received PRGF therapy were analyzed as a single cohort. Because of the absence of an internal contemporaneous control arm, treatment outcomes were compared with historical data and external control cohorts from published literature on conventional NSAIDs and celecoxib^(6, 10).

Research Instruments

A medical cost data collection form was used to collect all of the treatment cost data. The cost analysis used the payer perspective, calculated from direct medical costs, which included clinical examination fees, radiology fees, procedure fees, and the cost of treating gastrointestinal (GI) complications. All cost parameters for traditional NSAIDs and celecoxib were directly extracted from a previously published economic evaluation⁽⁶⁾. The traditional NSAID regimen represented standard non-selective NSAIDs over 6 months, whereas celecoxib was parameterized at 200 mg daily. Direct medical costs included drug acquisition and the management of upper GI complications. Non-GI systemic adverse events were excluded, as GI complications represent the primary cost driver. For PRGF, as an autologous product, no systemic GI toxicity occurs; transient local injection discomfort was managed within standard outpatient visit fees without extra cost. Downstream TKA costs and surgical incidence were analyzed descriptively as clinical and health-economic outcomes to evaluate the rate of surgical conversion and were excluded from primary short-term incremental cost-effectiveness ratio (ICER) calculations.

A patient data collection form included information on baseline data, risk factors, and clinical symptom data. This study used a retrospective medical record review.

Study Variables

Independent variables included age, severity of knee osteoarthritis according to KL grading, underlying diseases, regular medications, history of injury, and history of previous knee osteoarthritis treatment. Dependent variables included the WOMAC score and utility value.

Population and Sample

The inclusion criteria were Buddhist monk patients aged ≥ 55 years with knee osteoarthritis of any KL stage who had failed conservative treatment (including anti-inflammatory drugs, physical therapy, and supportive devices), were recommended for surgery, and had not received viscosupplement injections during the treatment period.

Those with contraindications to PRGF injection (such as platelet disorders or knee joint infection), who had previously received more than one PRGF injection in the same joint within 1 year, or who had received a steroid or viscosupplement injection within the preceding 3 months were excluded.

Data Analysis

The analysis was performed by deriving the utility value from the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score, which is a commonly used outcome measure for knee osteoarthritis. The WOMAC score was converted into a utility value using a mathematical model. The utility values obtained from treatment at each time point were then compared with the direct costs of treatment in order to calculate the ICER. Costs included only direct medical costs, namely product costs (such as the injection kit), the cost of the preparation and injection process, and related medical supplies, and did not include indirect costs such as loss of productivity or travel expenses, in order to keep the analysis clear and to reduce its complexity.

Deterministic one-way sensitivity analysis was performed to evaluate the robustness of the calculated ICERs against parameter uncertainty. Key variables, including PRGF procedure cost, drug comparator costs (incorporating GI complication costs), and baseline and 6-month utility gains, were varied independently within a $\pm 20\%$ range from their baseline values. ICERs were recalculated across each parameter range, and the findings were visually summarized using a tornado diagram.

RESULTS

Study Population

A total of 197 patients received PRGF injection at Priest Hospital between January 2022 and December 2024 (Table 1).

Utility Outcomes

The mean utility score increased from 0.5957 at baseline to 0.7252 at month 6 (utility gain = 0.1295), which was the period of peak effectiveness, before decreasing to 0.6660 at month 12.

Cost Outcomes

The total cost of PRGF injection was 6,000 THB, whereas those for NSAIDs and celecoxib were 3,762.64 and 7,719.78 THB (the highest among the comparator drugs), respectively. Among the group of patients for whom standard conservative treatment had failed (197 cases) and who had been recommended for TKA surgery, 19 (9.64%) cases underwent surgery, with an average surgical cost of 105,213.30 THB/case (Table 2).

Table 1 Demographic data and total WOMAC score according to time in patients with knee osteoarthritis who were treated with plasma rich in growth factors (n = 197).

Age	65.28 ± 8.58
WOMAC score (total, 96)	
Baseline	32.71 ± 17.51
1 Month postinjection	13.74 ± 9.49
6 Months postinjection	13.15 ± 9.35
12 Months postinjection	23.24 ± 14.57

Values are presented as mean ± standard deviation.

The WOMAC score was adjusted to a total of 96 according to the utility score formula.

Abbreviations: WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

Table 2 Total cost of evaluation and treatment in patients with knee osteoarthritis who were treated with PRGF.

Outpatient office visit ^a	1,500
Knee radiographs	500
Single PRGF injection ^b	4,000
Traditional NSAID drug cost ^c	334.9886
GI complication cost, traditional NSAIDs ^c	1,427.649
Celecoxib ^c	3,959.708
GI complication cost, celecoxib ^c	1,760.071

All costs are reported in Thai baht and represent actual internal hospital unit costs rather than patient billed charges.

^aIncludes physician consultation fee, clinical staff time, and facility and medical equipment utilization.

^bRepresents a single intra-articular injection; fully includes the commercial PRGF preparation kit, blood collection disposables, and laboratory centrifugation processing.

^cDrug acquisition costs and upper GI complication management costs for traditional NSAIDs and celecoxib were directly parameterized from Turajane et al. ⁽⁶⁾. Total costs represent direct medical costs over a 6-month treatment horizon from a healthcare provider perspective.

Abbreviations: PRGF, plasma rich in growth factors; NSAID, non-steroidal anti-inflammatory; GI, gastrointestinal.

Cost-effectiveness Analysis

Month 6 was designated as the primary comparative endpoint to align directly with published utility data for traditional NSAIDs and

celecoxib ^(6, 10), which were evaluated at a 6-month horizon.

The ICER for PRGF versus NSAIDs was 41,059.01 THB per 6-month utility gain, whereas

that for PRGF versus celecoxib was -36,212.45 THB per 6-month utility gain, indicating an economically dominant status, i.e., an option that provides better treatment outcomes at a lower cost.

The total costs for each intervention are as follows: PRGF, 6,000 (1,500 + 500 + 4,000); traditional NSAIDs, 3,762.637 (1,500 + 500 + 334.98 + 1,427.65); celecoxib, 7,719.779 (1,500 + 500 + 3,959.7 + 1,760.07). The mean calculated utility score at different time points were 0.5957 ± 0.1698 at baseline, 0.7228 ± 0.0586 at 1 month, 0.7252 ± 0.0573 at 6 months, and 0.6660 ± 0.1090 at 12 months. The calculated utility difference and cost per utility at different time points of PRGF injection were $0.7228 - 0.5957 = 0.1271$ and $6,000/0.1271 = 47,206.92$, respectively, at 1 month; $0.7252 - 0.5957 = 0.1295$ and $6,000/0.1295 = 46,332.05$, respectively, at 6 months; and $0.6660 - 0.5957 = 0.0703$ and $= 6,000/0.0703 = 85,348.51$, respectively, at 12 months.

To compare with the other interventions (NSAIDs and celecoxib), the ICER formula was used: $(Ca - Cb)/(Ua - Ub)$. Meanwhile, to calculate

the utility gain for NSAIDs and celecoxib, the 6-month utility values (0.595 and 0.602, respectively) were obtained from the study by Turajane et al.⁽⁶⁾, and the baseline utility score was derived from Raeissadat et al., parameterized at approximately 0.52⁽¹⁰⁾. Consequently, the resulting 6-month utility gains for NSAIDs and celecoxib were 0.075 and 0.082, respectively.

The ICER of PRGF compared with NSAIDs at 6 months was $(6,000 - 3,762.637)/(0.1295 - 0.075) = 41,059.01$ THB per 6-month utility gain, indicating that to improve the utility score, a higher cost is required, which is a rationale for the new innovation. The ICER of PRGF compared with celecoxib at 6 months was $(6,000 - 7,719.797)/(0.1295 - 0.082) = -36,212.45$ THB per 6-month utility gain, indicating that the utility score improved while using a lower cost, which is strongly suggestive of using PRGF rather than celecoxib. All relevant cost, utility, incremental outcomes, and ICER results are summarized in Table 3.

Table 3 Cost utility and ICER comparison at 6 months posttreatment.

Parameter/metric	Traditional NSAIDs	Celecoxib	PRGF injection
Baseline utility	0.5200	0.5200	0.5957
6-Month utility	0.5950	0.6020	0.7252
Utility gain (ΔU)	0.0750	0.0820	0.1295
Total direct cost (THB)	3,762.64	7,719.78	6,000.00
Cost per utility gain (THB)	50,168.53	94,143.66	46,332.05
Incremental cost (ΔC , THB)	Reference	Reference	+2,237.36 (vs. NSAIDs) -1,719.78 (vs. celecoxib)
Incremental effectiveness (ΔU)	Reference	Reference	+0.0545 (vs. NSAIDs) +0.0475 (vs. celecoxib)
ICER (THB/6-month utility gain)	Reference	Reference	+41,059.01 (vs. NSAIDs) -36,212.45 (vs. celecoxib)
Economic status	Reference	Reference	Favorable (vs. NSAIDs) Economically dominant (vs. celecoxib)

The utility gain (ΔU) and ICER were evaluated at the primary 6-month comparative endpoint. Negative ICER indicates economically dominant status (higher utility gain at lower overall cost). This short-term economic evaluation does not incorporate lifetime quality-adjusted life years or downstream total knee arthroplasty costs.

Abbreviations: NSAID, non-steroidal anti-inflammatory drug; PRGF, plasma rich in growth factors; THB, Thai baht; ICER, incremental cost-effectiveness ratio.

Sensitivity Analysis

Across all tested parameter ranges ($\pm 20\%$), PRGF consistently maintained its economically dominant status relative to celecoxib (remaining lower in cost and higher in utility gain). For the comparison with traditional NSAIDs, the one-way sensitivity analysis demonstrated that the ICER was most sensitive to variations in PRGF 6-month utility gain and procedure cost (Figure 1). Varying

the PRGF 6-month utility gain (0.1036 to 0.1554) produced ICERs ranging from 27,816 to 78,289 THB per 6-month utility gain; meanwhile, varying the PRGF procedure cost (4,800 to 7,200 THB) yielded ICERs between 19,286 and 63,163 THB per 6-month utility gain. Nevertheless, across all sensitivity scenarios, PRGF consistently demonstrated favorable economic outcomes compared with traditional NSAIDs.

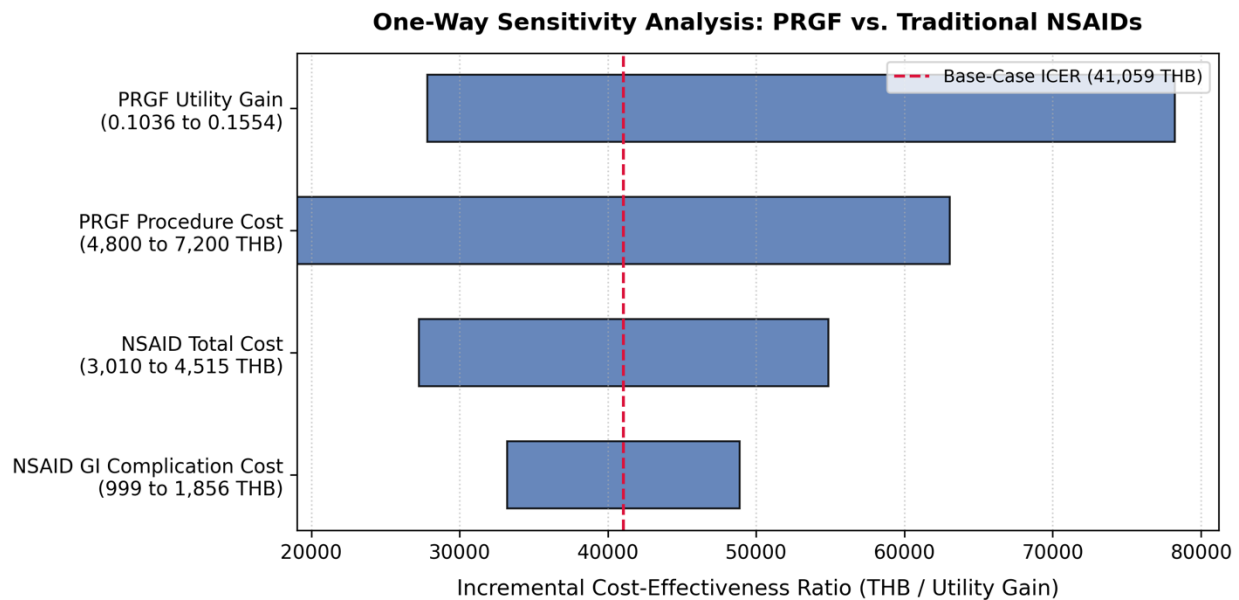


Fig. 1 Tornado diagram of the one-way sensitivity analysis for PRGF versus traditional NSAIDs. The vertical dashed line represents the base-case ICER of 41,059 THB per 6-month utility gain. Horizontal bars represent the range in ICER values generated by varying each input parameter by $\pm 20\%$. The one-way sensitivity analysis for celecoxib was omitted from the plot, as PRGF maintained its economically dominant status across all tested parameter ranges ($\pm 20\%$). This short-term economic evaluation does not incorporate lifetime quality-adjusted life years or downstream total knee arthroplasty costs. PRGF, plasma rich in growth factors; NSAID, non-steroidal anti-inflammatory; GI, gastrointestinal; ICER, incremental cost-effectiveness ratio.

DISCUSSION

Knee osteoarthritis is an important problem affecting the quality of life of populations worldwide, especially in an era when the average life expectancy of the population is increasing. Knee osteoarthritis is among the top 10 causes of disability worldwide, affecting daily life, the ability to care for oneself, and work, which has a direct impact on the aging society in Thailand⁽¹⁵⁾. Several studies have focused on stimulating the regene-

ration of degenerated cartilage, particularly the role of growth factors on normal and injured tissue. Current evidence supports that the use of growth factors has a wide-ranging effect on cartilage regeneration, both from in vitro and in vivo studies⁽¹⁶⁾.

PRGF treatment is an easily accessible method with a reasonable cost and a low complication rate that does not differ from that of a general injection. An important advantage is that it

can be produced from the patient's own platelets, which already contain natural growth factors. It is therefore regarded as a treatment approach with high potential for cartilage regeneration and relief of knee osteoarthritis symptoms and offers a viable non-surgical alternative for many patients ⁽¹⁷⁾.

There are several approaches for preparing concentrated platelets. One study conducted in 100 patients assessed treatment effectiveness using the WOMAC index and visual analog scale pain scores at several time points after injection. The results found statistically significant pain relief and improvement in functional ability, with the WOMAC score decreasing from 81.06 to 63.52 and the visual analog scale score decreasing from 7.53 to 3.09 within a period of 6 months. The treatment produced clear results in patients with a low body mass index and early-stage knee osteoarthritis. The researchers concluded that treatment with concentrated platelets is safe, with minor side effects found in 18% of patients, reflecting that it is an attractive option for treating knee osteoarthritis without surgery ⁽¹⁸⁾.

Subsequent research has demonstrated the regenerative potential of platelet treatment, particularly in knee osteoarthritis. Although the true mechanism of action remains unclear, the study results support its important role in cartilage repair and regeneration ⁽¹⁹⁾. A randomized controlled trial compared the effectiveness of PRGF treatment versus prolotherapy using dextrose. The results found that concentrated platelets were superior in relieving pain and improving knee function in patients with knee osteoarthritis, and these results were sustained for 24 weeks ⁽²⁰⁾. A study that compared treatment with concentrated platelets combined with hyaluronic acid versus steroid alone found that the combined treatment was more effective in reducing pain and improving functional outcomes at 3 months, indicating the possibility of a synergistic treatment effect if the methods are chosen appropriately ⁽²¹⁾.

The study by Turajane et al. on the use of high-quality plasma for treating knee osteoarthritis found that the triple-spin method of preparing concentrated platelets, which consists of concentrated platelets and blood proteins, can

significantly increase treatment effectiveness. Furthermore, their prospective study analyzed the use of high-quality plasma in treating patients with knee osteoarthritis who were older than 60 years and did not respond to other conservative treatments, focusing on safety as the primary outcome and pain relief as a secondary outcome. Follow-up at 6 months found that the pain score decreased from 71 to 52 out of a full score of 100, and the surgery rate in the group with grade 2–3 knee osteoarthritis was 5.6%, whereas that in the group with grade 4 knee osteoarthritis was 10.8%⁽⁶⁾. In 2021, Turajane et al. conducted a randomized controlled trial in 557 patients with knee osteoarthritis, dividing the patients into two groups: a group treated with high-quality plasma injection and a group treated with steroid injection (triamcinolone 40 mg) ⁽²²⁾. Follow-up over a period of 12–18.5 months showed that the International Knee Documentation Committee Subjective Knee Form and WOMAC scores differed significantly, with the group treated with high-quality plasma showing better changes, except during the first 2 months, when both groups responded similarly. The secondary outcome, the pain score, tended to move in the same direction as the primary outcome. In 2021, Turajane et al. conducted a survival analysis study in 184 patients with knee osteoarthritis, with outcomes followed for a period of 24 months. The results showed that the surgery rate could be reduced by as much as 87.5%; in patients with grade 1–3 knee osteoarthritis, the surgery rate was reduced by 94%, and in the group with grade 4 knee osteoarthritis, the surgery rate was reduced by 76% ⁽¹¹⁾.

In 2023, Cheeva-Akrapan and Turajane conducted a survival analysis in 368 patients with knee osteoarthritis, with outcomes observed for 36 months. The results showed that the rate of unnecessary surgery could be reduced by as much as 80%. However, no study has analyzed cost utility to assess the economic value of treatment with high-quality plasma in this context ⁽¹²⁾.

This CEA of PRGF injection in a group of Thai patients aged ≥55 years with knee osteoarthritis at multiple stages who did not respond to supportive (conservative) treatment

revealed important points on clinical efficacy analysis and utility, economic evaluation, and reduction of surgical burden and complications.

Clinical Efficacy Analysis and Utility

The results of this study showed that PRGF treatment can significantly increase the patient's utility score, with the mean increasing to its highest point at month 6 (utility gain = 0.1295), which is consistent with the report of Turajane et al., who found that PRGF helps reduce inflammation and promote cartilage repair. However, the utility value tended to decrease slightly at month 12 (decreased to 0.0703), reflecting that the effect of biologic therapy may regress over time, which is an important point to consider when planning repeat treatment or long-term follow-up.

Economic Evaluation

PRGF had a lower cost per 6-month utility gained than NSAIDs and celecoxib (46,332 THB versus 50,169 and 94,114 THB, respectively). Based on the ICER, PRGF was associated with favorable short-term economic outcomes compared with NSAIDs and maintained an economically dominant status compared with celecoxib, indicating that it provides better treatment outcomes at a lower cost. However, the analysis compared the PRGF cohort against comparator parameters derived from published historical literature rather than a contemporaneous control group, meaning these findings are exploratory and should not be interpreted as definitive evidence. Furthermore, health outcomes were captured as 6-month utility gains (Δ Utility) rather than lifetime quality-adjusted life years (Δ QALYs). Consequently, this metric cannot be benchmarked directly against Thailand's national willingness-to-pay threshold of 160,000 THB per QALY gained.

Reducing Surgical Burden and Complications

Data from the study demonstrated that during the 12-month follow-up, only 19 (9.64%) of 197 patients underwent TKA. This low surgical rate is an economically important finding, as TKA surgery constitutes a major driver of treatment costs (accounting for 67%–90% of the total

expenditure in the comparator drug groups). However, owing to the single-arm retrospective design without a contemporaneous control group, this study cannot definitively determine whether PRGF itself directly delayed or prevented TKA. Beyond surgical considerations, the application of PRGF avoids the prolonged use of NSAIDs and their associated GI complications, which incur substantial direct medical costs averaging 1,427–1,760 THB/event.

This study has limitations that should be considered. First, the follow-up period of only 1 year allows assessment of preliminary data on effectiveness and cost-effectiveness but cannot fully reflect long-term outcomes; therefore, studies with longer follow-up periods should be conducted to confirm the durability of the treatment results. Second, the sample used in the study comprised Buddhist monks who underwent treatment at Priest Hospital, which may reflect only a specific segment of the population aged ≥ 55 years with knee osteoarthritis and may differ from the general population, which has more varied lifestyles and physical activities. Third, our economic evaluation was conducted solely from a payer perspective, focusing exclusively on direct medical costs. Consequently, indirect costs, such as productivity loss and caregiver burden, were excluded from the analysis. This exclusion may underestimate the broader societal economic impact and represents a limitation in providing a holistic health-economic evaluation. Future research adopting a societal perspective is warranted to capture these indirect burdens. Finally, our study used the mapping algorithm by Barton et al.⁽¹⁴⁾ to estimate the EuroQol 5-Dimension utility scores from WOMAC data. Because this algorithm was calibrated in an overseas population, it has not been cross-validated in Thai patients with knee osteoarthritis. This unvalidated transferability stands as a methodological limitation, and the predicted utility estimates should therefore be interpreted with caution.

CONCLUSION

The results of this study suggest that PRGF treatment was associated with favorable short-term economic outcomes compared with externally

derived estimates for standard drug treatment and maintained an economically dominant status compared with celecoxib in terms of both direct cost and utility gains. This finding reflects the potential of PRGF as a therapeutic option that demonstrate a low rate of surgical conversion, may alleviate direct economic burdens, and improve the quality of life of patients aged ≥ 55 years who do not respond to conservative treatment. However, as these preliminary findings represent exploratory evidence derived from a non-contemporaneous single cohort, a long-term analysis using a health-economic model, such as the Markov model, should be performed to simulate lifetime impacts using empirical surgical transition probabilities from the literature, in order to estimate the ICER in THB per QALY according to international standards before informing national healthcare policy.

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