Budget Impact Analysis of Fracture Risk Assessment(FRAX) Based Treatment Strategy Selection in Patients with Glucocorticoid-Induced Osteoporosis (GIOP)

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Background

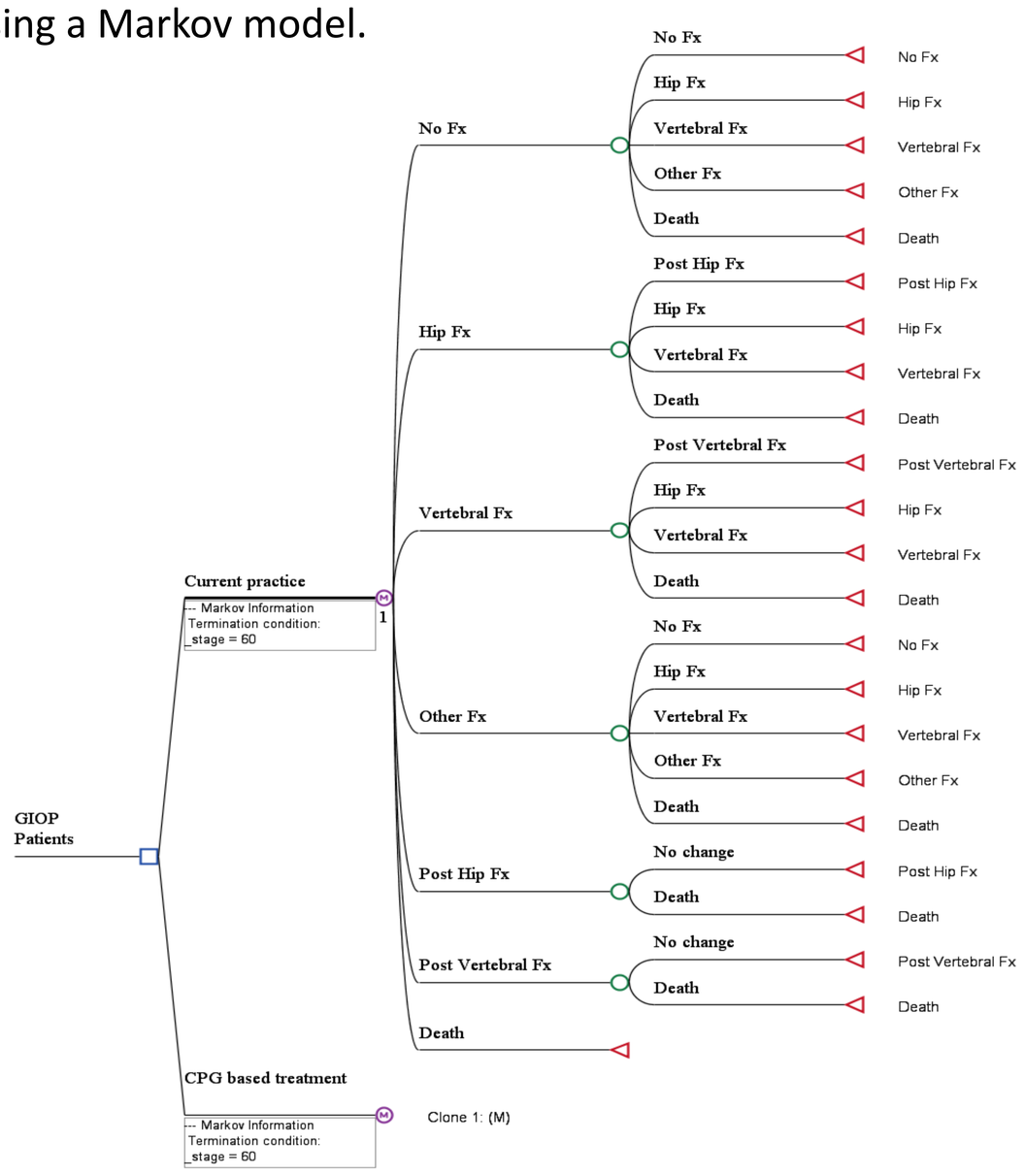
Fracture risk assessment(FRAX) was developed in 2008 by the World Health Organization to assess the risk of fractures in patients. FRAX can predict individual patient fracture risk by comprehensively considering clinical risk factors. However, in South Korea, FRAX is not reflected in clinical treatment guidelines and reimbursement criteria. The current glucoc-
orticoid induced osteoporosis (GIOP) treatment reimbursement criteria for the patients < 50 years old uses
bone mineral density (BMD) Z-score < -3.0 (i.e. the lowest 0.13%) and cumulative dose of glucocorticoid ≥ 450mg.

Objective

This study aims to estimate the budget impacts of reimbursemen t strategies based on FRAX in
South Korea where BMD is currently used for reimbursement of t reating the patients with GIOP.

Methods

10% sample of claims data for GIOP patients from the National Health Insurance Service(NHIS) in 2012-2019 and a literature review including NECA(2010) were used. Select patients who have been on glucocorticoid(GC) since 2015 and have not had their first GC prescription fracture. After the selection process, 2,520,896 patients were included in the analysis of fracture incidence under the current BMD-based reimbursement criteria. A budget impact analysis was conducted on 1,683,936 patients who did not meet the current reimbursement criteria and were not receiving osteoporosis medications. A budget impact for GIOP using the FRAX formula(Ha et al., 2016) was estimated using a Markov model.



Results

- The current reimbursement criteria using BMD appear to be restrictive for patients in their 40s, covering only 0.13% of the population, while at least one major osteoporotic fracture occurred in 0.28% of this group(0.36% for males and 0.19% for females)(Table1).

Table 1. Fracture Prevalance in Patients by Age

	Total(%)	Men(%)	Women(%)
N (%)	0.42	0.48	0.36
Under 40	0.16	0.21	0.11
40-49	**0.28**	**0.36**	**0.19**
50-59	0.53	0.60	0.44
60-69	0.89	0.89	0.89
70-79	1.80	1.58	2.20
Over 80	3.99	3.09	5.09

Table 2. Cost of fracture treatment for GIOP patients

Unit : USD	N	Mean(SD)	Median
Any fracture	16,016	0.48	114.39
Femur fracture	13,675	0.21	114.06
Vertebra fracture	2,390	0.36	139.19
Femur fracture & Vertebra fracture	120	2371.73 (3527.65)	505.82

- FRAX Budget impact scenarios
  - S1 : budget impact scenarios along with coverage for the whole GIOP patient scenario
  - S2 : budget impact scenarios along with coverage for the patient who are more than **1.0** fracture risk cut-off
  - S3 : budget impact scenarios along with coverage for the patient who are more than **1.2** fracture risk cut-off
  - S4 : budget impact scenarios along with coverage for the patient who are more than **1.4** fracture risk cut-off
- Three fracture risk thresholds(HR=1.0, 1.2, 1.4) of FRAX were utilized in the budget impact scenarios, alongside coverage for the entire GIOP patient population(S1). The highest annual budget impact was observed in S1, amounting to 350 million USD, while the lowest was for HR≥1.4(S4) at 17 million USD. Nevertheless, S1 was the most cost-effective in preventing osteoporotic fractures, with a cost of 100K USD per fracture prevented, compared to 240K USD per fracture for S4.

Conclusion

- The current GIOP reimbursement criteria seems to need some revision especially for the patients in 40's.
- The projected budget impact of transitioning to fracture risk-based criteria appears substantial. Therefore, further refinement of existing osteoporotic fracture risk assessment tools is necessary to better inform future deliberations on this matter.