Cost-Effectiveness of NALIRIFOX as a First-Line Treatment for Metastatic Pancreatic Cancer in Taiwan

EE286

Ming-Yu Hong[1], Chen-Han Chueh[1], Wei-Ming Huang[1], Nai-Jung Chiang[2], Yi-Wen Tsai[1]

[1]National Yang Ming Chiao Tung University, Taipei, Taiwan; [2]Taipei Veterans General Hospital, Taipei, Taiwan

Background

- The NAPOLI 3 trial demonstrated that NALIRIFOX, a novel combined systemic chemotherapy regimen, significantly improves survival compared to gemcitabine plus nab-paclitaxel (GEM/NAB-P) in treatment- naïve patients with metastatic pancreatic cancer (mPC).
- Despite its clinical benefits, previous economic evaluations from the US and China perspectives concluded that the NALIRIFOX is not cost-effective.

Objective

- To evaluate the cost-effectiveness of NALIRIFOX as a first-line systemic treatment for patients with mPC compared to GEM/NAB-P from Taiwan National Health Insurance Administration (NHIA's) perspective.

Methods

Table 1. Analytical framework and model inputs of the base case

Population	Treatment-naïve patients with metastatic pancreatic cancer
Intervention	NALIRIFOX (liposomal irinotecan, oxaliplatin, 5-FU, leucovorin)
Comparator	Gemcitabine plus nab-paclitaxel
Outcome	Total cost, Quality-adjusted life-years (QALYs)
CEA outcome	Incremental cost-effectiveness ratio (ICER) and incremental net monetary benefit (INMB)
Economic model	3-state partitioned survival model (Fig.1): progression-free (PF), progressed-disease (PD), and death
Perspective	Taiwan's NHIA
Cycle length	4 weeks
Time horizon	40 years
Discount rate	3% per year to costs and QALYs
Willingness-to-pay	3 times the GDP per capita in 2023 (NT$3,023,055)
Sensitivity analysis	■ Deterministic sensitivity analysis (DSA) ■ Probabilistic sensitivity analysis (PSA) ■ Value of information analysis
Scenario analysis	■ Considering life years as effectiveness ■ Adjusting time on treatment ■ No applying a conversion factor to non-medication cost ■ Adjusting adverse events incurred duration, time horizon, and discount rate
Parameter source	■ The efficacy data and time on treatment were derived from the NAPOLI 3 trials. ■ NALIRIFOX costs were derived from Taiwan NHI listing price. (NT$ 608,269 per year per m^2) ■ Medication, non-medication, and subsequent costs during the PD state were estimated from Taiwan NHI claims data. ■ The utility data were derived from previous literature.

Base-case results

- Compared with GEM/NAB-P, NALIRIFOX demonstrated an increase of 0.121 QALYs, with an incremental cost of NT$347,574. This results in an ICER of NT$2,870,784 per QALY and an INMB of NT$18,436.

Table 2. Base-case results

	Outcomes of Partitioned Survival Models		Incremental Changes
Treatment strategy	NALIRIFOX	GEM/NAB-P	NALIRIFOX vs. GEM/NAB-P
Cost(NT$)	2,309,356	1,961,782	347,574
QALY	0.855	0.734	0.121
ICER			2,870,784
INMB			18,436
EVPI/person			115,864

EVPI: expected value of perfect information; GEM/NAB-P: gemcitabine plus nab-paclitaxel;
ICER: incremental cost-effectiveness ratio; INMB: incremental net monetary benefit; NT$: New Taiwan Dollars

Sensitivity analysis results

- The DSA revealed (Fig.2) that the most influential parameters on uncertainty were the medication and non-medication cost of NALIRIFOX and GEM/NAB-P, the utility value during the PF state, body surface area, efficacy parameters, and the subsequent costs.

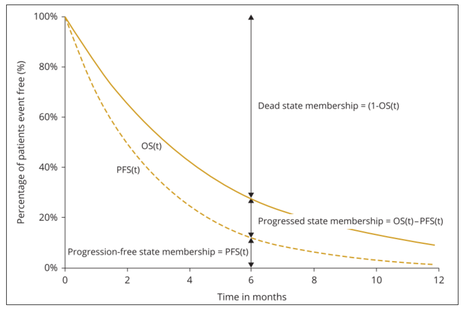

Figure 1. Partitioned survival model

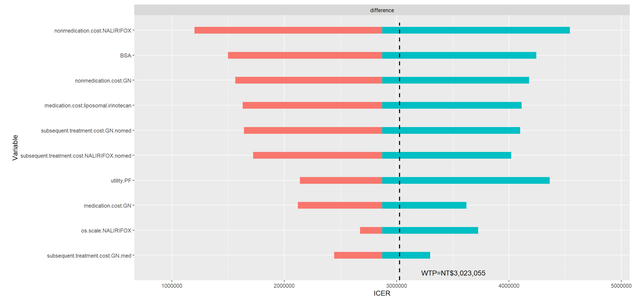

Figure 2. Results of DSA: NALIRIFOX vs. GEM/NAB-P

- NALIRIFOX yielded higher effectiveness at higher costs (Fig.3A) and demonstrated a 53.6% probability of being cost-effective compared to GEM/NAB-P (Fig.3B)

(A) (B)

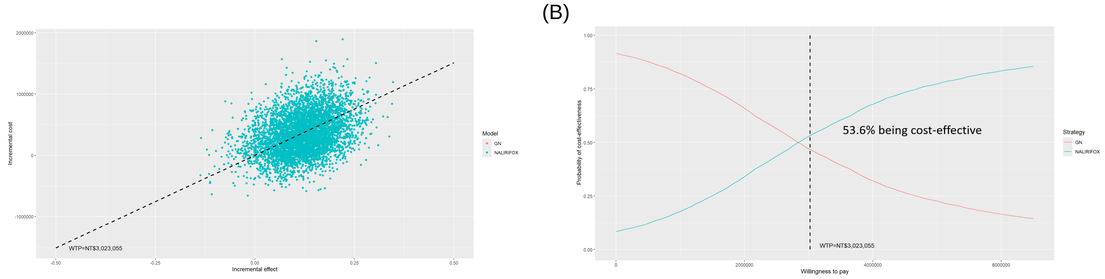

Figure 3. (A) 5,000 simulation results on the cost-effectiveness plane
(B) Cost-effectiveness acceptability curve (NALIRIFOX vs. GEM/NAB-P)

Scenario analysis results

- Shortening the treatment duration led to much lower ICERs, increasing the probability of being cost-effective.
- NALIRIFOX is not cost-effective in scenarios with a high frequency of adverse events.

Table 3. Scenario analysis results

	NALIRIFOX vs. GEM/NAB-P				
	Base-case analysis		Probabilistic sensitivity analysis		
Scenario	ICER (NT$/QALY)	INMB (NT$)	ICER (NT$/QALY)	Probability of being cost-effectiveness	EVPI/person
01. Base case (drug continuation until PD)	2,870,784	18,436	2,867,940	53.6%	115,864
02. Life years as effectiveness	2,310,192	107,252	2,296,064	63.9%	77,731
03. Drug discontinuation at median TOT	1,155,221	226,144	1,127,126	78.4%	42,926
04. Drug discontinuation at median PFS time	1,619,161	169,974	1,595,720	72.6%	57,070
05. Drug discontinuation at the end of RCT follow-up period	2,779,433	29,496	2,767,148	55.2%	110,161
06. Time horizons 3 years	2,929,136	9,807	2,941,452	52.7%	116,613
07. Time horizons 5 years	2,873,895	17,857	2,873,188	53.6%	115,981
08. Time horizons 10 years	2,870,786	18,436	2,867,951	53.6%	115,864
09. AEs are incurred in the PFS state every cycle	4,439,679	-112,492	4,540,244	36.7%	74,461
10. AEs are incurred in each health state every cycle	4,627,632	-122,602	4,793,578	35.0%	69,614
11. Discount rate 3.5%	2,874,492	17,828	2,871,928	53.6%	115,580
12. Discount rate 5.0%	2,885,636	16,064	2,883,906	53.4%	114,746
13. No applying a conversion factor to non-medication cost	2,996,489	3,216	3,078,464	51.3%	131,958

Conclusions

- Unlike previous studies, our findings indicate that NALIRIFOX is cost-effective compared with GEM/NAB-P from the perspective of Taiwan's NHIA, despite considerable uncertainty.

NATIONAL YANG MING CHIAO TUNG UNIVERSITY

Contact information: Ming-Yu Hong, student of NYCU, e-mail: s312109003.md12@nycu.edu.tw;
Yi-Wen Tsai, professor of NYCU, e-mail: ywtsai@nycu.edu.tw;
Nai-Jung Chiang, medical doctor of Taipei Veterans General Hospital, e-mail: njchiang@vghtpe.gov.tw.