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Data to Dialogue: Communicating Radiotherapy's Value to Advance Care

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The Cost Effectiveness of Neoadjuvant FOLFIRINOX vs. Gemcitabine Based Chemoradiotherapy (CRT) for Resectable or Borderline-Resectable Pancreatic Ductal Adenocarcinoma

Nandita M. Kasireddy, BA; Bassem Zaki, MD, MBBS; Nirav Kapadia, MD, MS; James Yu, MD, FASTRO, MHS

Disclosure

I have no conflicts of interest to disclose.

Goals

1. To understand the current pancreatic ductal adenocarcinoma (PDAC) treatment paradigm, and the impact of neoadjuvant FOLFIRINOX versus neoadjuvant gemcitabine-based chemoradiotherapy in resectable and borderline resectable pancreatic cancer (PREOPANC-2)
2. To quantitatively compare costs & toxicities of clinically equivalent treatments

Learning Objectives

- To **interpret** decision tree values including quality-adjusted life months and health utility states
- To quantitatively **compare** neoadjuvant therapies for PDAC accounting for progression-free survival, costs of treatment, and treatment toxicities

PREOPANC-2

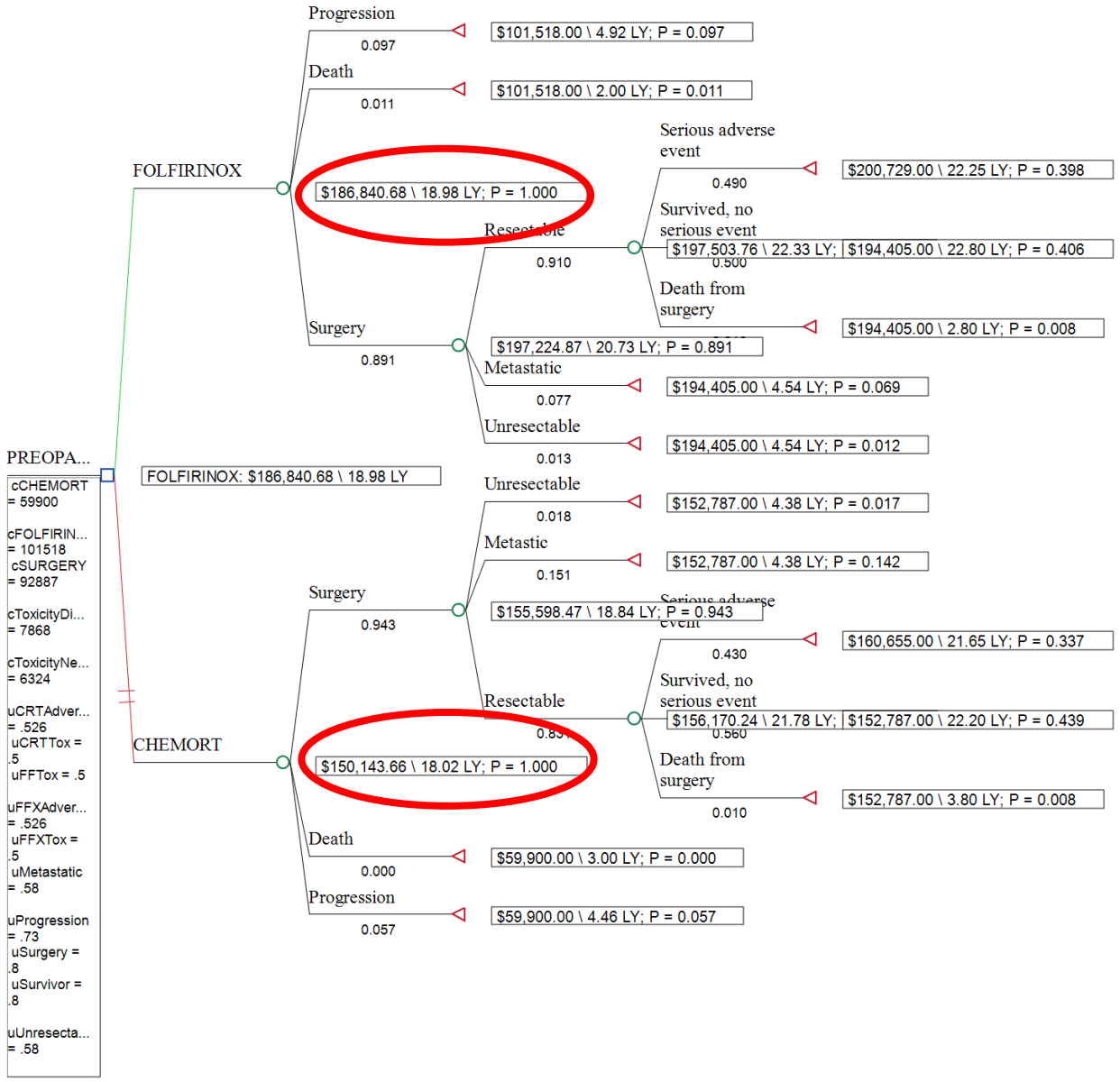
- Multicentre, open-label, randomized phase 3 trial testing the superiority of neoadjuvant FOLFIRINOX (FFX) to CRT for resectable & borderline-resectable PDAC

- Both arms (FFX & CRT) survived approximately 21-22 months. Though the treatments appear clinically equivalent, it is unclear whether differences arise when considering **toxicity** and **cost** of treatment

- Therefore, we created a decision tree to compare the risks and benefits of treating PDAC with FFX vs. CRT

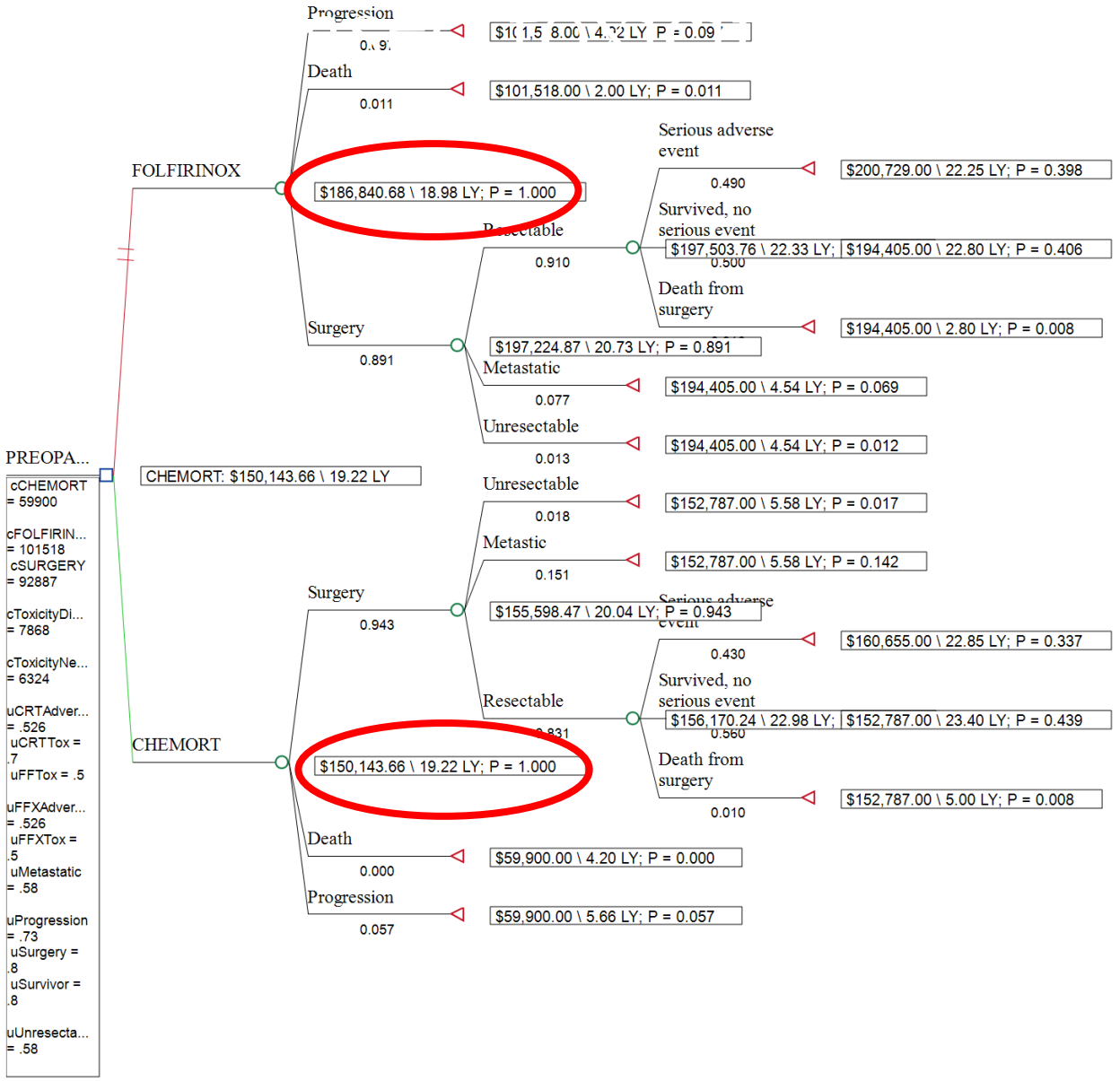
Model assumptions

Treatment	Costs	Length of treatment (months)
FOLFIRINOX (FFX)	$101,518	3
CRT	$59,900	6
Surgery	$99,157	1
Adverse events	Diarrhea treatment = $7,868 Neutropenia treatment = $6,324	3 (trial considered adverse events within 90 days)
Outcome	**Utility**	**Overall Survival (months)**
Progression-free survival (PFS), after resection	0.8	30
Metastatic or unresectable disease prior to surgery	0.73	8
Survival with progression after surgery (treatment-refractory)	0.58	3-6
Serious adverse events	0.526	3



Base case (equitoxic)

FFX treatment resulted in more Quality Adjusted Life Months (QALM)s (18.98 vs. 18.02) compared to CRT, but with an additional cost of **$36,697.02**



Improved CRT toxicity

If we decrease the toxicity of CRT relative to FFX, **CRT is cheaper & results in more QALMs** (19.22 vs. 18.98 QALMs, -$36,697.02)

Summary

PREOPANC-2 showed no significant survival difference in treating patients with resectable/borderline-resectable PDAC with neoadjuvant FFX vs. gemcitabine-based CRT (both arms surviving ~21-22 months).

Though the treatments appear clinically equivalent, **FFX costs significantly more than CRT.**

In our base case (assuming equal toxicity of FFX and CRT), FFX treatment resulted in more QALMs (18.98 vs. 18.02) compared to CRT, **but with an additional cost of $36,697.** However, if CRT toxicity is considered reduced relative to FOFIRINOX, CRT is preferred and dominant.

Conclusion: Though FFX results in slightly improved QALMs, the cost exceeds most definitions of societal willingness-to-pay ($440,364 per additional QALY). If the toxicity of CRT is considered significantly improved compared to FFX, CRT becomes the dominant strategy.