

Transradial versus Transfemoral Access for Interventional Oncology Procedures: A Systematic Review and Meta-Analysis

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BACKGROUND

- Hepatic angiography procedures such as transarterial chemo embolization (TACE) and transarterial radioembolization (TARE) are essential for treating patients with hepatocellular carcinoma (HCC)
- There are numerous studies published comparing safety, feasibility and patient comfort outcomes for transradial access (TRA) vs transfemoral access (TFA) which are limited by small sample sizes
- The broad procedural and clinical outcomes regarding a transradial approach versus a transfemoral approach for interventional oncology (IO) procedures are unclear and warrant study via meta-analysis

OBJECTIVES

- The goal of this study is to investigate the incidence of TRA and TFA and to assess for access and non access site complications as well as patient comfort and radiation safety for both approaches

METHODS

- The Cochrane Library and MEDLINE databases were searched for all studies detailing the outcomes of TARE and TACE interventional oncologic procedures
- Studies were screened by title and abstract to assess for inclusion
- We included any study that detailed any comparison of outcomes of TRA vs TFA for chemoembolization or radioembolization interventions for HCC
- Studies with sample sizes less than 50 patients were excluded
- Outcome variables included:
 - procedural technical success
 - complication rates
 - Patient preference
 - Fluoroscopy time
 - contrast dose
 - patient skin dose
- An inverse variance fixed effects model was utilized to calculate pooled odds ratios (OR) for dichotomous results and pooled means for continuous variables.

RESULTS: Study Characteristics

- Literature Search**
 - 147 total unique studies were identified
 - Examination of abstracts screened out 131 studies
 - 16 papers were intensely reviewed
 - 13 studies were included
- Study Characteristics**
 - Results encompassed 2799 IO procedures
 - 1501 TRA
 - 1298 TFA
 - Composite complication rate of 6.55% (4.98% of TRA, 8.27% of TFA)
 - There was significant study heterogeneity (I^2 of 80%, $Tau^2 = 1.11$, $p < .01$)
 - Attributed to significant differences in radiation dose and contrast dose between studies
- Quantitative Synthesis & Meta Analysis**
 - Patients were 100-fold more likely to prefer TRA versus TFA
 - Odds of adverse events (excluding access failure) were higher for TFA
 - No differences in access failure rates or overall complication rates
 - There were no differences in procedure time, radiation dose, or contrast dose
 - Total fluoroscopy time was borderline longer for TRA but insignificant

Table 1: Study Characteristics. Details the year of each study included in the meta-analysis along with the study type, design, oncologic procedure, and number of patients in each cohort.

Study, Year	Study type, Design	Procedure	TRA, n	TFA, n
Ghosh et al, 2022	Single Center, Retrospective	TARE	188	63
Toyoda et al, 2021	Single Center, Retrospective	TACE	206	240
Jiang et al, 2022	Single Center, Randomized Controlled Trial	TACE	90	30
Du et al, 2019	Single Center, Retrospective	TACE	112	107
Ghosh et al, 2022	Single Center, Retrospective	TACE	90	56
Shiozawa et al, 2003	Single Center, Retrospective	TACE	177	150
Livshits et al, 2017	Single Center, Retrospective	TACE	100	102
Kis et al, 2016	Single Center, Retrospective	TARE	33	31
You et al, 2023	Single Center, Retrospective	TACE	131	145
Loewenstern et al, 2018	Single Center, Retrospective	TARE	302	302
Iezzi et al, 2017	Single center, prospective	TACE	42	42
Liu et al, 2018	Single center, Controlled crossover	TARE	30	30
Ghosh et al, 2022	Single Center, Retrospective	TARE	188	63

CONCLUSIONS

- No statistically significant difference observed in TACE and TARE procedures for most endpoints
- Femoral artery access involved higher risk of access complications such as hematoma's which is likely inherit to the site
- Our study supports that TRA is a safe an effective method for performing TACE and TARE procedures
- Additional randomized clinical trials should be conducted to further evaluate the outcomes of both access sites

LIMITATIONS

- Relatively high rates of study heterogeneity
- Procedural endpoints such as fluoroscopy time, radiation dose, and contrast dose all varied significantly
- Likely reflective of site- and operator-specific differences
- Trainees versus attending primary operators
- The same trend was not demonstrated for adverse events nor patient preference, where all included studies showed comparable figures.
- Most studies were non-randomized and retrospective cohorts
- Selection bias as operators may be more comfortable with a traditional TFA when considering more complex cases

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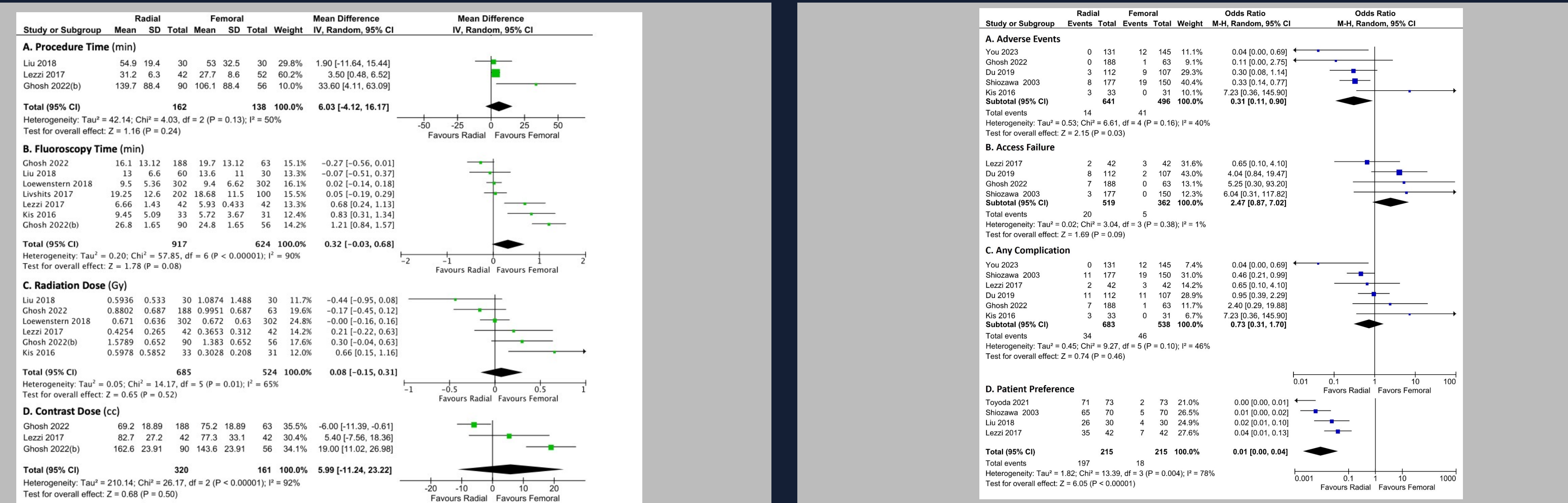


Figure 2. Forest plot of binary measures. The odds of adverse events (A, B, C) and preferring radial versus femoral approach (D) are plotted using the Mantel-Haenszel method.

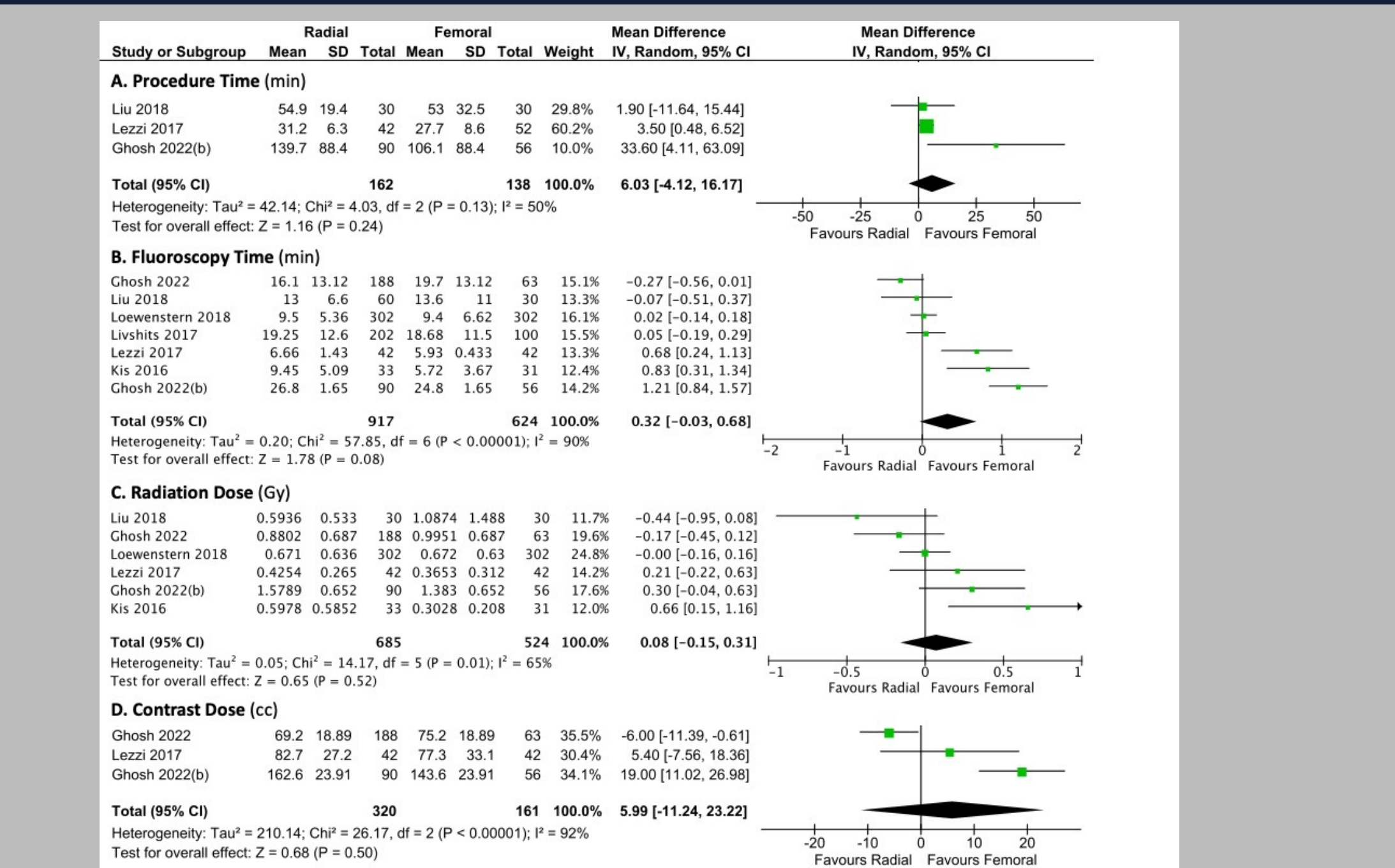


Figure 1. Forest plot of continuous measures. Procedural statistics are plotted as mean differences using the inverse variance method.