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在ERAS理念下对比桡动脉入路与股动脉入路TACE的临床疗效

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摘　要

背景：肿瘤患者外周血炎症指标与长期和短期预后密切相关。然而，不同干预方法对炎症指标的影响尚不清楚。目的：我们的目的是证明经桡动脉途径的经导管动脉化疗栓塞(TACE)具有较低的炎症反应，更能体现加速康复外科(ERAS)理念。材料与方法：自2023年1月至2024年12月，在重庆医科大学附属第二医院肝胆外科，对242例首次接受经动脉化疗栓塞(TACE)治疗的肝癌患者进行了回顾性分析。其中，103例患者接受经肝动脉化疗(TFA)治疗，139例患者接受经肝动脉化疗栓塞(TRA)治疗。对TFA组和TRA组患者的围手术期临床数据进行了分析和比较。主要关注点为全身炎症反应水平，其次为一般状况、舒适度、总住院时间和术后疼痛评分。结果：两组的基线数据无显著差异。经腹手术(TRA)组的术后中性粒细胞与淋巴细胞比值(NLR) (8.4 [95%置信区间5.0~12.0] VS 10.7 [95%置信区间5.4~18.9]；P = 0.02)和血小板与淋巴细胞比值(PLR) (145.1 [95%置信区间85.7~211.2] VS 181.1 [95%置信区间114.0~303.7]；P = 0.026)显著低于经腹主动脉手术(TFA)组。经腹手术组的术后淋巴细胞与单核细胞比值(LMR) (1.6 [95%置信区间1.2~2.5] VS 1.4 [95%置信区间1.0~2.2]；P = 0.011)高于经腹主动脉手术组。经腹手术组的术后疼痛评分低于经腹主动脉手术组(3 [95%置信区间3~4] VS 4 [95%置信区间3~5]；P = 0.005)，且差异具有统计学意义。结论：在减少术后全身炎症反应方面，经桡动脉介入途径相较于股动脉途径具有更多优势，且更能体现加速康复外科(ERAS)理念。

关键词

TACE (经动脉化疗栓塞术)，加速康复外科，肝脏肿瘤，桡动脉入路，股动脉入路

Comparison of Clinical Efficacy of TACE via Radial Artery Approach versus Femoral Artery Approach under the ERAS Concept

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Abstract

Background: The indices of peripheral blood inflammation in tumor patients are closely related to the long-term and short-term prognosis. However, the effect of different intervention methods on inflammatory indices is not clear. Objectives: Our purpose is to prove that TACE trans radial artery approach has lower inflammation reaction and better reflects the ERAS concept. Material and Methods: From January 2023 to December 2024, 242 patients who were diagnosed with liver cancer and received TACE treatment for the first time were analyzed retrospectively in the Department of Hepatobiliary Surgery, the Second Affiliated Hospital of Chongqing Medical University. Among them, 103 patients received treatment via femoral artery approach (TFA), and 139 patients received treatment via radial artery approach (TRA). The clinical data of TRA group and TFA group were analyzed and compared during the perioperative period. The main concern was the level of systemic inflammatory response, followed by the general condition, comfort, overall length of hospital stay and postoperative pain score. Results: There was no significant difference in baseline data between the two groups. Postoperative neutrophil-to-lymphocyte ratio (NLR) (8.4 [95%CI 5.0~12.0] VS 10.7 [95%CI 5.4~18.9]; P = 0.02) and platelet-to-lymphocyte ratio (PLR) (145.1 [95%CI 85.7~211.2] VS 181.1 [95%CI 114.0~303.7]; P = 0.026) in TRA group were significantly lower than those in TFA group. Postoperative lymphocyte-to-monocyte ratio (LMR) (1.6 [95%CI 1.2~2.5] VS 1.4 [95%CI 1.0~2.2]; P = 0.011) in TRA group was higher than that in TFA group. Postoperative pain score was lower in TRA group than in TFA group (3 [95%CI 3~4] VS 4 [95%CI 3~5]; P = 0.005), and the difference was statistically significant. Conclusions: Interventional pathway via radial artery has more advantages than the femoral artery in reducing postoperative systemic inflammatory reaction and better reflects the ERAS concept.

Keywords

TACE, Enhanced Recovery after Surgery, Liver Cancer, Radial Artery Approach, Femoral Artery Approach

1. 前言

目前，手术仍是大多数实体性肝脏肿瘤(原发性肝细胞癌、肝内胆管癌、结直肠转移性肝癌等)治疗的主要选择。然而，经导管动脉化疗栓塞(Transcatheter arterial chemoembolization, TACE)是晚期肝癌(HCC、ICC、转移等)不可切除患者的推荐治疗方案之一。肝癌 TACE 可经桡动脉或股动脉入路。目前临床上仍以股动脉入路为主。在中国，经桡动脉入路的肝癌介入治疗仅在部分医疗机构开展。

自 19 世纪以来，Balkwill 等人首次提出炎症与肿瘤有关[1]。目前，越来越多的证据表明，肿瘤微环境中的炎症反应在各种恶性肿瘤的发生、发展和转移中起着重要作用[2]。肿瘤相关炎症的主要特征是细

胞因子产生、白细胞浸润、组织重塑和血管生成[3]。炎症性血液或生化成分，如血小板、单核细胞、中性粒细胞或淋巴细胞，已被结合起来反映肿瘤的炎症状态。许多证据表明，外周血炎症标志物可以预测恶性肿瘤(肝癌、结直肠癌、乳腺癌等)患者的预后，包括中性粒细胞与淋巴细胞比值(NLR)、血小板与淋巴细胞比值(PLR)、淋巴细胞与单核细胞比值(LMR) [4]-[13]。

加速康复外科(Enhanced Recovery after Surgery, ERAS)的概念由 Henrik Kehlet 提出[14]，因为 ERAS 的概念是由接受结直肠手术的患者提出的。通过优化围手术期各项措施，使外科、麻醉、护理等学科相互融合。尽量减少患者的生理和心理压力，减少术后并发症，加速患者的康复。目前已有多项研究表明，在开放肝切除术和腹腔镜肝切除术中，这些方案在提高患者舒适度、减轻全身应激反应、减少术后并发症、缩短总住院时间、延长生存期等方面是可行、安全、有效的[15]-[22]。ERAS 计划目前用于肝恶性肿瘤患者接受 TACE。本中心坚持 ERAS 理念在肝恶性肿瘤 TACE 患者中的应用。

2. 目的

然而，在 ERSA 理念下，对不同介入途径的肝恶性肿瘤患者 TACE 术后全身炎症反应程度的研究有限。本研究的目的是评价两组患者的术后反应，比较哪种介入途径在肝癌 TACE 治疗中更有利。进一步确定哪种介入途径最符合 ERSA 理念。

3. 方法

3.1. 研究对象

本研究选取重庆医科大学第二附属医院肝胆外科 2023 年 1 月至 2024 年 12 月首次接受 TACE 治疗的肝癌(HCC、ICC、转移)患者的临床资料。所有手术均由同一位介入医师进行。介入入路的选择是由介入医生评估介入通路血管情况及患者本人的意愿。回顾性分析临床及影像学资料，包括年龄、性别、生化指标、血清 AFP 水平、肿瘤大小、肿瘤数目、血管侵犯情况等，进行基线评估。住院期间，通过患者的手术时间、住院时间、住院医嘱、护理记录收集手术细节、功能恢复时间、并发症等数据。NLR、PLR、LMR 根据术前 7 天内最后一次血常规计数及术后 3 天内最后一次血常规计数计算。

3.2. 纳入标准和排除标准

纳入标准：1) 首次接受肝恶性肿瘤 TACE 治疗的患者；2) 肝功能 Child A/B 级；3) 临床治疗资料完整。

排除标准：1) 既往接受过 TACE 的患者；2) 围手术期临床或影像学资料不完整；3) 肝硬化失代偿期；4) 有严重心脑血管疾病的；5) 肾功能不全或肾功能紊乱患者；6) 术前使用类固醇，有胆道感染、肺部感染或者泌尿系统感染；7) 完全门静脉闭塞，无侧支血供。

3.3. ERAS 流程

手术前一天：

通过多种宣传方式向患者及家属介绍 ERAS 模式及其优势，并介绍 TACE 的治疗方法及优势。术前饮食方面，给予优质蛋白饮食、低脂饮食及个性化口服营养制剂。

手术日：

患者术前可正常饮食，术前不常规置胃管及肠道准备(术中即使置胃管或尿道导管，术后也应尽快拔除)，鼓励患者深呼吸，锻炼患者有效的咳嗽、肺功能、翻身、肢体活动等。鼓励患者麻醉前保持稳定的精神状态，减少血压波动和应激的发生。手术室温度应保持恒定、适宜，患者应注意保暖，如使用静脉

输液加热器等。使用热毯、加热器等，保持病人体温恒定。术中患者应尽量采取舒适的体位，减少局部肢体受压造成的远端血供。患者应尽量采取舒适的体位，减少肢体局部受压造成的远端血供。手术后，他被转到紧急抢救病房。手术后避免过量补液。术后常规静脉镇痛，如术后无严重胃肠道副作用，应按照临床营养科建议恢复口服水及肠内营养摄入。

术后第一天：

复查血常规、凝血、肝功能、电解质、血氨、感染等指标。TFA 组若穿刺部位无异常，则取下动脉压迫器后尽快下床。如血液检查未见明显异常，且无严重胃肠道症状，应停止静脉输液。根据临床营养科的意见制定肠内营养方案。有乙肝基本病史的人开始服用抗乙肝药物(恩替卡韦等)、泻药(乳果糖等)和口服止痛药(非甾体抗炎药)。

手术后第二天：

复查血常规、凝血、肝功能、电解质、血浆氨、感染等指标。出院标准以治疗第一天为基础进行评估。如果病人符合出院标准。外科医生的联系方式也提供给患者。

出院：

当满足以下所有标准时，患者被认为是功能恢复：仅口服镇痛的疼痛完全控制；活动能力恢复到独立或术前水平；无静脉输注；吃固体食物的能力；血清胆红素水平或国际标准化比值(INR)正常或降低。功能恢复时间自手术当日起评估。

3.4. 手术操作流程

经桡动脉入路(TRA)：

常规穿刺点选择患者左手至桡骨突近端约 1 cm 处的脉动动脉。消毒、铺毛巾后，缓慢注射 2%利多卡因约 1~2 mL 局部麻醉，沿血管两侧动脉注射麻醉剂。麻醉满意后，用专用单臂桡动脉穿刺针(PSI-4F-11-018, MERIT Medical)在左手接触动脉脉搏处穿刺。成功后，插入导丝并放置 4F 血管鞘(PSI-4F-11-018, MERIT Medical)。然后注射事先配制好的抗凝、止痉剂(肝素 2000 u + 硝酸甘油 200 ug + 生理盐水 20 mL)固定鞘。在全透视下将 4F 桡动脉专用导管(PV412538U1, MERIT Medical)和导丝(LWSTDA35180, MERIT Medical)插入动脉，在腹主动脉内找到膈动脉、腹腔干动脉、肝总动脉、肠系膜上动脉、肾动脉等靶血管(根据不同肿瘤情况选择)。确定肿瘤供血血管的分布和来源，必要时进行多方向血管造影。在微导丝(10A11818, APT Medical)的配合下，将微导管(28mc24150sn, MERIT Medical)送入靶血管进行化疗栓塞。术后拔出穿刺鞘，用瑞星医疗 AP-S-180 型桡动脉压迫止血带压迫 4 小时止血。

经股动脉入路：

常规选择右股动脉穿刺，采用 5F 穿刺鞘(RCFN-5.0-18-MPIS-NT, COOK Medical) Seldinger 穿刺法穿刺成功。使用相同型号的造影剂导管(HPWA-35-150, COOK Medical)。在造影剂导丝(HPWA-35-150, COOK Medical)的引导下，根据病情需要将导管置入腹腔干、肝总动脉或肠系膜上动脉。将 2.4F 微导管(28MC24130SN, MERIT Medical)与微导丝(10A11818, APT Medical)一起插入肿瘤靶血管进行化疗栓塞。术后拔出穿刺鞘，用右股动脉电子压迫止血钳(01-GF-A, RISING Medical)按压 8 小时止血。

3.5. 统计分析

采用 SPSS 19.0 统计软件对数据进行统计分析。符合正态分布的计量资料用 Mean ± SD 表示，不符合正态分布的计量资料用 Median (Q1~Q3)表示。组间比较采用 Mann-Whitney U 秩和检验。计数资料和等级资料采用卡方检验或 Fisher 精确检验进行分析。当 $T < 1$ 或 $N < 40$ 时，采用 Fisher 精确检验(T：理论频率，N：样本量)。$P < 0.05$ 为差异有统计学意义。

4. 结果

4.1. TRA 组和 TFA 组人口统计学及基线资料

2019 年 1 月至 2020 年 12 月，242 例患者根据不同介入途径分为两组：103 例患者分为 TFA 组，139 例患者分为 TRA 组。两组患者人口学及基线数据见表 1。两组患者的一般临床资料，如年龄、性别、最大肿瘤直径、儿童 Pugh 分级、甲胎蛋白(AFP)、实验室检测谷丙转氨酶(ALT)、天冬氨酸转氨酶(AST)、总胆红素(TBIL)、HCC/ICC 数量等差异无统计学意义(表 1、表 2)。两组患者术前中性粒细胞与淋巴细胞比值(NLR)、血小板与淋巴细胞比值(PLR)、淋巴细胞与单核细胞比值(LMR)比较，差异均无统计学意义(表 2)。

Table 1. Demographic and baseline characteristics
表 1. 研究对象和基线资料

Variables		TRA (n = 139)	TFA (n = 103)	Value	P
Age (years) (*Median*, *Q*1~*Q*3)		58 (49~67)	56 (48~65)	$Z = -1.402$	0.161
Gender (*N*)	Male	114	78	$\chi^2 = 1.426$	0.262
	Female	25	25		
Child-Pugh stage (*N*)	A	117	92	$\chi^2 = 1.331$	0.263
	B	22	11		
	HCC	124	89	$\chi^2 = 0.440$	0.507
	ICC	10	8	$\chi^2 = 0.028$	0.867
	Metastatic liver cancer	5	6	$\chi^2 = 0.677$	0.411

HCC: Hepatocellular carcinoma; ICC: Intrahepatic cholangiocarcinoma; *Z*: The statistical values of Mann-Whitney test; χ^2: The statistical values of Chi-squared test.

Table 2. Comparison of preoperative laboratory tests
表 2. 术前临床实验室检查对比

Variables	TRA (n = 139)	TFA (n = 103)	Value	P
Tumor size (cm) (*Median*, *Q*1~*Q*3)	51 (26~100)	42 (15~87)	$Z = -1.561$	0.118
AFP (ug/L) (*Median*, *Q*1~*Q*3)	4.3 (0.0~39.7)	4.6 (0.0~13.5)	$Z = -0.384$	0.701
ALT (U/L) (Median, Q1~Q3)	35 (23~48)	42 (26~59)	$Z = -1.640$	0.101
AST (U/L) (Median, Q1~Q3)	38 (26~64)	45 (30~67)	$Z = -1.258$	0.209
TB (umol/L) (Median, Q1~Q3)	13.0 (10.0~19.3)	12.1 (7.7~19.0)	$Z = -1.746$	0.081
Neu/Lym(%) (*Median*, *Q*1~*Q*3)	2.9 (1.7~4.4)	2.8 (2.0~4.3)	$Z = -0.179$	0.858
PLT/Lym(%) *Median*, *Q*1~*Q*3)	128.5 (82.2~172.1)	111.9 (75.2~164.2)	$Z = -0.842$	0.400
Lym/Mono (%) (*Median*, *Q*1~*Q*3)	2.6 (2.0~3.5)	2.8 (2.1~4.2)	$Z = -1.354$	0.176

Neu: Neutrophils; Lym: Lymphocyte; Mono: Monocyte; ALT: Alanine aminotransferase; AST: Aspartate aminotransferase; TB: Total bilirubin; *Z*: The statistical values of Mann-Whitney test.

4.2. TRA 组和 TFA 组术中临床资料

两组术中临床资料比较，手术过程详细资料分析见表 3，TFA 组吡柔比星用量与 TRA 组比较差异无统计学意义(20 (20~60) VS 40 (20~50), P = 0.795)。TRA 组手术时间与 TRA 组(75 (65~95) VS 70 (60~90))比较，差异无统计学意义(P = 0.113)。但这在统计学上并不显著。脂醇、微球和空白微球的含量差异无统计学意义。

Table 3. Comparison of intraoperative clinical data
表 3. 术中临床数据对比

Variables	TRA (*n* = 139)	TFA (*n* = 103)	Value	P
Lipiodol (mL) (Median, Q1~Q3)	10 (10~10)	10 (6~10)	*Z* = −0.108	0.914
Drug loaded microspheres (N) (Median, Q1~Q3)	1 (0~5)	1 (0~10)	*Z* = −1.179	0.238
Blank microspheres (N) (Median, Q1~Q3)	1 (0~1)	0 (0~5)	*Z* = −0.637	0.524
Pirarubicin (mg) (Median, Q1~Q3)	20 (20~60)	40 (20~50)	*Z* = −0.259	0.795
Operation time (min) (*Median*, *Q*1~*Q*3)	75 (65~95)	70 (60~90)	*Z* = −1.587	0.113

Z: The statistical values of Mann-Whitney test.

4.3. TRA 组与 TFA 组术后临床资料比较

术后 TRA 组中性粒细胞与淋巴细胞比值(NLR)中位数(Q1, Q3) (8.4 [5.0~12.0] VS 10.7 [5.4~18.9]; P = 0.02)、血小板与淋巴细胞比值(PLR) (Q1, Q3) (145.1 [95%CI 85.7~211.2] VS 181.1; P = 0.026)显著低于 TFA 组(见表 4)。术后 TRA 组淋巴细胞/单核细胞比(LMR) (1.6 [95%CI 1.2 ~ 2.5] VS 1.4 [95%CI 1.0~2.2]; P = 0.011)高于 TFA 组(表 4)。TRA 组 ALT 低于 TFA 组(54 (30~128) VS 72 (40~139); P = 0.036)，差异有统计学意义，两组术后 AST、总胆红素差异无统计学意义(见表 4)。TRA 组术后疼痛评分(3 [95%CI 3~4] VS 4 [95%CI 3~5]; P = 0.005)低于 TFA 组(见表 5)。TRA 组术后呕吐、尿潴留、血压升高等不良反应发生率低于 TFA 组(见表 5)。两组患者术中、术后动脉痉挛比例、肝功能 Child-Pugh 评分恶化、发热、乏力、腹水、腹泻、腹内感染等差异均无统计学意义(表 5)。

Table 4. Comparison of postoperative laboratory tests
表 4. 术后临床数据对比

Variables	TRA (*n* = 139)	TFA (*n* = 103)	Value	P
ALT (U/L) (*Median*, *Q*1~*Q*3)	54 (30~128)	72 (40~139)	*Z* = −2.102	**0.036**
AST (U/L) (*Median*, *Q*1~*Q*3)	76 (36~187)	103 (49~198)	Z = −1.390	0.164
TB (umol/L) (*Median*, *Q*1~*Q*3)	18.5 (12.3~26.9)	17.7 (13~28.3)	*Z* = −0.356	0.722
Neu/Lym (%) (Median, Q1~Q3)	8.4 (5.0~12.0)	10.7 (5.4~18.9)	*Z* = −2.328	**0.020**
PLT/Lym (%) (*Median*, *Q*1~*Q*3)	145.1 (85.7~211.2)	181.1 (114.0~303.7)	*Z* = −2.229	**0.026**
Lym/Mono (%) (*Median*, *Q*1~*Q*3)	1.6 (1.2~2.5)	1.4 (1.0~2.2)	*Z* = −2.535	**0.011**

Neu: Neutrophils; Lym: Lymphocyte; Mono: Monocyte; ALT: Alanine aminotransferase; AST: Aspartate aminotransferase; TB: Total bilirubin; *Z*: The statistical values of Mann-Whitney test.

Table 5. Comparison of postoperative recovery status
表 5. 术后恢复情况比较

Variables	TRA (n = 139)	TFA (n = 103)	Value	P
		Child grade (N)		
A	117	92	χ^2 = 1.331	0.263
B	22	11		
		Arterial spasm (N)		
No	138	99	χ^2 = 2.927	0.166
Yes	1	4		
		Fever (N)		
No	79	52	χ^2 = 0.960	0.362
Yes	60	51		
		Weakness (N)		
No	115	90	χ^2 = 0.985	0.369
Yes	24	13		
		Nausea (N)		
No	85	53	χ^2 = 2.269	0.149
Yes	54	50		
		Vomit (N)		
No	125	79	χ^2 = 7.822	**0.007**
Yes	14	24		
		Constipation (N)		
No	131	100	χ^2 = 1.102	0.362
Yes	8	3		
		Abdominal pain (N)		
No	20	19	χ^2 = 0.721	0.480
Yes	119	84		
		Ascites (N)		
No	135	100	χ^2 = 0.000	1.000
Yes	4	3		
		Diarrhea (N)		
No	137	103	χ^2 = 1.494	0.509
Yes	2	0		
		Hypertension (N)		
No	133	89	χ^2 = 6.714	**0.016**
Yes	6	14		

续表

		Intrahepatic infection (*N*)		
No	136	103	$\chi^2 = 2.251$	0.264
Yes	3	0		
		Urinary retention (*N*)		
No	131	83	$\chi^2 = 15.505$	**0.000**
Yes	5	20		
		Pain score (*Median*, *Q*1~*Q*3)		
	3 (3~4)	4 (3~5)	$Z = -2.823$	**0.005**
Hospital stay (day) (*Median*, *Q*1~*Q*3)				
	10 (7~17)	10 (7~15)	$Z = -0.101$	0.919

Z: The statistical values of Mann-Whitney test; χ^2: The statistical values of chi-squared test.

4.4. TRA 组与 TFA 组血管穿刺相关并发症的比较

两组均未出现动脉夹层、血栓形成、血肿、假性动脉瘤等与血管穿刺相关的并发症。

5. 讨论

目前，TACE 主要用于经股动脉肝恶性肿瘤的治疗。这种方法有很多问题。首先，要求患者仰卧位，右下肢固定至少 8 小时，以避免穿刺部位术后出血。它显著增加了术后尿潴留、疼痛和不适的风险。其次，晚期肝恶性肿瘤患者体质普遍较差，术后长时间固定会增加全身应激水平和炎症反应，影响患者手术效果和预后。目前，包括我中心在内的一些医疗中心已经开始采用桡动脉作为肝恶性肿瘤介入治疗的穿刺入路。由于桡动脉处于浅表解剖位置，便于压迫止血，拔出动脉鞘后的压迫时间仅为 3～4 小时。术后无须限制肢体活动，可避免腰痛、尿潴留、深静脉血栓形成等并发症。经桡动脉入路肝恶性肿瘤介入治疗在我中心越来越受欢迎。在我们的单一中心，许多经桡动脉入路的肝恶性肿瘤 TACE 治疗已经完成，表明经桡动脉入路的 TACE 是安全有效的。

许多研究表明，炎症在各种恶性肿瘤的形成和发展中起着重要作用，并可能影响恶性肿瘤患者的生存。复杂的恶性微环境是影响肿瘤预后的重要因素。由于世界各地临床实验室使用廉价和客观的血液检查，中性粒细胞、淋巴细胞、单核细胞和血小板是常见的炎症标志物，形成 NLR、PLR 和 LMR 指数，反映患者的炎症状态。目前，NLR、PLR 和 LMR 作为一种新的全身性炎症标志物被广泛报道，尤其是作为一种预后标志物。它的研究涵盖了多种疾病类型，包括癌症。这些研究主要集中在其值[12] [23] [24]的预测价值上。目前已有研究分析了可能导致这些参数变化的情况，并尝试建立 PLR、NLR 和 LMR 的 RIS [25]-[27]。

迄今为止，已有几项研究调查了接受 TACE 的肝癌患者 NLR、PLR、LMR 与预后之间的关系。首先，恶性肿瘤患者血小板较多。研究发现，血小板不仅参与血液凝固，而且还分泌一定的生长因子，如 TGF-β、血小板源性生长因子、VEGF、PF4、凝血素等。这些生长因子刺激肿瘤细胞的增殖、生长和转移[28]-[30]。其次，中性粒细胞产生抑制淋巴细胞和自然杀伤细胞免疫活性的趋化因子和细胞因子[31]-[33]。癌细胞与中性粒细胞的相互作用产生炎症反应，导致癌细胞的增殖、侵袭和转移。第三，淋巴细胞是一种负责抗肿瘤免疫的炎性细胞，B 细胞、$CD8^+$细胞毒性 T 细胞和 $CD4^+$辅助性 T 细胞在肿瘤细胞裂解过

程中起重要作用[34]。淋巴细胞数量减少可能表明免疫机制异常，免疫监测功能下降，无法清除影响肿瘤微环境的肿瘤细胞，导致肿瘤转移和侵袭[35]。最后，单核细胞是炎症细胞，分泌单核细胞趋化蛋白-1、肿瘤坏死因子-α、白细胞介素-6、转化生长因子-α，并产生白细胞介素-1，促进恶性肿瘤的远处转移、血管生成和肿瘤发生[36]。有趣的是，血小板、单核细胞、中性粒细胞和淋巴细胞的绝对数量在个体之间差异很大，但 NLR、PLR 和 LMR 是这两种细胞的绝对数量之比，在以往的研究中已被证明是相对稳定的[25]-[27]。对比分析术前、术中临床资料，两组一般资料、实验室资料无明显差异，各对照组基线平衡。术后主观感受方面，TRA 组术后疼痛评分(3 [95%CI 3~4] VS 4 [95%CI 3~5]; P = 0.005)低于 TFA 组，差异有统计学意义。这与 Iezzi 等人和 Yamada 等人的报告[37] [38]一致。TRA 组术后呕吐、尿潴留、血压升高等不良反应发生率低于 TFA 组。结合实验室检查，TRA 患者术后中性粒细胞－淋巴细胞比率(NLR)显著低于 TFA 患者(8.4 [95% CI 5.0~12.0] VS 10.7 [95% CI 5.4~18.9]; P = 0.02)。Luo 等报道 NLR 是一个相对稳定的指标，不随年龄和性别发生显著变化[27]。他们建立了 NLR 的 RI 为 0.88~4.027。肝癌介入治疗后全身炎症反应和应激水平明显升高，尤其是 TFA 组。同时，本研究发现，高 NLR 合并天冬氨酸转氨酶与丙氨酸转氨酶比值与肝癌患者 TACE 术后总生存率较差独立相关[39]，血小板与淋巴细胞比值(PLR) TRA 组显著低于 TFA 组(145.1 [95%CI 85.7~211.2] VS 181.1 [95%CI 114.0~303.7]; P = 0.026)。Nicolini 等报道 PLR bbb150 是 TACE 术后肿瘤复发的独立预测因子[40]。术后淋巴细胞/单核细胞比率(LMR)：TRA 组患者高于 TFA 组(1.6 [95%CI 1.2~2.5] VS 1.4 [95%CI 1.0~2.2]; P = 0.011)。Luo 等报道，他们建立的 LMR RI 为 2.63~9.90 [27]。总体而言，该值在术后较术前显著降低，并超出了正常阻力指数(RI)值范围，这可以解释为淋巴细胞进一步减少和单核细胞相对增加。总之，患者的主观感受和术后实验室检查结果均表明，在术后短时间内，经桡动脉(TRA)组患者的全身炎症反应和应激水平低于经股动脉(TFA)组。同时，术后对两组患者进行了口腔调查。大多数经桡动脉患者没有拒绝下一阶段的介入治疗，并继续选择桡动脉入路，而大多数经股动脉患者则更愿意尝试桡动脉入路进行下一阶段的治疗。

我们中心是少数几个使用 ERAS 概念来管理肝脏恶性肿瘤干预的医疗中心之一，本研究比较了两种不同的介入途径对全身炎症反应的影响。术后增强恢复(ERAS)的概念是由 Henrik Kehlet 在 2001 年提出的。ERAS 在肝胆外科的应用起步较晚，在肝恶性肿瘤 TACE 中的应用更是少之又少。目前，我中心所有围手术期患者均按照 ERAS 的理念进行管理。

本研究存在一些局限性。首先，这是一项回顾性的、手工提取和手工输入的、单中心的、对相对有限数量的短期肝恶性肿瘤患者围手术期临床资料的比较研究。为了消除本研究的局限性，需要更大的样本量、多中心、长期的临床数据来进一步阐明放射入路在肝脏恶性肿瘤介入治疗中的优势。其次，本研究结果仅反映了术后短时间内患者的全身应激状态和全身性炎症水平。经桡动脉穿刺路径是否有利于肝恶性肿瘤患者介入手术的远期疗效，甚至是否对肿瘤的预后有影响，目前尚不清楚。

6. 结论

经桡动脉入路比经股动脉入路在改善患者术后舒适度和减少术后全身炎症反应方面更有利。同时，经桡动脉通路在肝癌短期介入治疗中更能体现 ERAS 理念。但鉴于本研究的局限性，不同介入途径对肝恶性肿瘤 TACE 远期疗效的影响还需进一步研究证实。

声　明

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