

PET/CT 中 SUV 值与鼻咽癌临床分期的相关性研究

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[摘要] 目的:研究鼻咽癌患者 PET/CT 中的鼻咽原发灶 SUV_{max}(SUV_{max-T})、转移淋巴结 SUV_{max}(SUV_{max-N})和鼻咽原发灶 SUV_{max} 与转移淋巴结 SUV_{max} 中取较大值(SUV_{max} 值)与分期之间的临床意义。方法:收集 54 例初治鼻咽癌患者治疗前的临床资料及 PET/CT 中的 SUV_{max} 值,使用 Spearman 相关性分析比较 PET/CT 的 SUV_{max-T}、SUV_{max-N} 和 SUV_{max} 值与临床分期之间的相关性。结果:SUV_{max-T} 与 T 分期、临床分期之间差异有统计学意义($P < 0.05$);SUV_{max-N} 与 N 分期、临床分期之间差异有统计学意义($P < 0.01$);SUV_{max} 与 T 分期、N 分期、临床分期之间差异有统计学意义($P < 0.01$);SUV_{max} 与病理类型之间差异无统计学意义($P > 0.05$)。结论:PET/CT 中 SUV_{max} 值与鼻咽癌临床分期有关。

[关键词] 鼻咽肿瘤;PET/CT;临床分期;SUV_{max}

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The relationship between SUV values in PET/CT and clinical staging of nasopharyngeal carcinoma

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Abstract Objective: The purpose of this study was to research the relationship between SUV_{max-T}, SUV_{max-N} and SUV_{max} value in the PET/CT and clinical stage in patients of nasopharyngeal carcinoma(NPC). **Method:** Collect the clinical data and SUV values of Fifty-four patients. The statistical analyses were performed by SPSS21.0 statistical software for Windows and the Pearson correlation analysis was used for data analysis. **Result:** SUV_{max-T} was significantly associated with T stage and clinical stage($P < 0.05$);SUV_{max-N} was significantly associated with N stage and clinical stage($P < 0.01$);SUV_{max} was significantly associated with T stage, N stage and clinical stage($P < 0.01$); there was no statistically significant difference between SUV_{max} and pathology ($P > 0.05$). **Conclusion:** The SUV values in PET/CT were associated with clinical stage of nasopharyngeal carcinoma(NPC).

Key words nasopharyngeal neoplasms; PET/CT;clinical stage; SUV_{max}

鼻咽癌是鼻咽上皮来源的头颈部恶性肿瘤,主要位于顶壁及侧壁,它有特异性流行区域,高发区域为中国香港、中国大陆南部,在中国南部地区发病率高达 30~50/10 万^[1]。早诊断和早治疗是确保疗效、提高生存率的关键所在。鼻咽癌的诊断需要结合临床表现及相关检查,其中病理检查是诊断的金标准^[2]。在影像学检查方面,传统手段主要有 CT 及 MRI,其中以 MRI 的应用最为广泛,但 MRI 对肿瘤诊断的灵敏度和特异度有限,临床亟需新的影像学诊断方法。

18F-FDG PET/CT 是一种新型全身成像技术,能够根据葡萄糖的代谢合并的功能和形态信息,根据高糖酵解率的高低凸显出肿瘤组织,而葡萄糖代谢的变化通常在物理变化或症状出现之前^[3]。研究表明,PET/CT 在鼻咽癌患者的诊断、分期、治疗方案的选择及总生存、无疾病进展等预

后评估方面非常重要^[4],其灵敏度和特异度可高达 88%和 97%^[5]。PET/CT 中最常用的参数是肿瘤代谢体积(metabolic tumor volume,MTV)、标准摄取值(standardized uptake value,SUV)、病灶糖酵解总量(total lesion glycolysis,TLG),其中 SUV 是衡量葡萄糖代谢的半定量参数标准摄取值,是局部肿瘤侵袭及远处转移风险的一种反应。有研究指出,SUV 值越高,TLG 越大,总生存时间及无疾病进展时间越短^[6]。另据报道在鼻咽癌及其他肿瘤患者 SUV_{max} 是一个独立预后分析因素,SUV_{max}<10 的患者有更高的缓解率^[7-9]。为了进一步评估 PET/CT 在鼻咽癌诊断中的应用价值,笔者开展了此项研究,旨在探讨鼻咽癌患者 PET/CT 的 SUV_{max-T}、SUV_{max-N} 和 SUV_{max-TOTAL} 值与 TNM 分期之间的相关性。

1 材料与方法

1.1 研究对象

收集 2014-04—2016-02 在我院住院的鼻咽癌患者 54 例,所有患者治疗前行 PET/CT 检测。其

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中男38例,女16例;年龄(50.98±13.26)岁。T分期:T₁期3例(5.6%),T₂期6例(11.1%),T₃期26例(48.1%),T₄期19例(35.2%)。N分期:N₀期2例(3.7%),N₁期17例(31.5%),N₂期29例(53.7%),N₃期6例(11.1%)。M分期:M₀53例(98.1%),M₁1例(1.9%)。按2008鼻咽癌国内分期标准:I期患者1例(1.9%),II期患者3例(5.6%),III期患者28例(51.9%),IV_a期患者20例(37%),IV_b期患者1例(1.9%)。病理分型采用WHO(2002)分型方法,其中WHO I型0例(0%),WHO II型20例(37%),WHO III型34例(63%)。

1.2 检测方法

1.2.1 PET/CT显像系统

显像设备及显像剂为美国GE公司生产。显像剂为¹⁸F-脱氧葡萄糖(¹⁸F-FDG),放化纯度>95%。检查前患者禁食一夜或至少4h,测手指血糖(<8mmol/L),显像剂经静脉注射(按说明书剂量注射)后等待休息1h并饮水约1000ml,排空小便。CT采集参数为层厚0.42cm,电流120mA,秒电压80kV。根据早期显像结果,若对局部病灶难以定性,则在2.5~3.0h后行局部延迟显像。图像由计算机自动重建得出全身冠状、矢状、横断面的CT、PET及PET/CT融合图像。由2名有经验的放射科医师共同读取SUV值。阳性标准为肿瘤病灶可见放射性浓聚且SUV_{max}值≥2.5。若无浓聚或轻度浓聚且SUV<2.5则为阴性。活检结果为确诊标准。

1.2.2 鼻内镜

采用电子鼻咽喉镜、纤维鼻咽镜检查及硬性鼻内镜检查观察肿瘤部位、大小及其表面的状况,并取活检行病理检查。

1.3 统计学处理

统计采用SPSS18.0统计软件包,采用Spearman相关性分析。PET/CT的SUV_{max}数据采用 $\bar{x} \pm s$ 表示。

2 结果

2.1 鼻咽原发灶SUV_{max}与分期的相关性

鼻咽原发灶SUV_{max}(SUV_{max}-T)与T分期、临床分期之间差异有统计学意义($P < 0.05$);SUV_{max}-T与N分期之间差异无统计学意义($P > 0.05$)。见图1。

2.2 淋巴结SUV_{max}与分期的相关性

淋巴结SUV_{max}(SUV_{max}-N)与N分期、临床分期之间差异有统计学意义($P < 0.01$);SUV_{max}-N与T分期之间差异无统计学意义($P > 0.05$)。见图2。

2.3 SUV_{max}-T与SUV_{max}-N取较大值与分期的相关性

SUV_{max}-T与SUV_{max}-N取较大值(SUV_{max})与T分期、N分期、临床分期之间差异有统计

学意义($P < 0.05$)。见图3。

2.4 SUV_{max}-T、SUV_{max}-N、SUV_{max}与病理类型的相关性

SUV_{max}-T、SUV_{max}-N、SUV_{max}与病理类型之间差异无统计学意义($P > 0.05$)。

3 讨论

研究表明,在头颈部肿瘤、肺癌和鼻咽癌中,PET中的SUV_{max}可以作为判断治疗后反应及复发的风险指标^[10-12],另有研究证实PET/CT在鼻咽癌患者的临床诊断、分期、治疗及预后评估等方面亦具有重要价值。对于放射性浓聚区域,评价SUV值可以间接反映肿瘤侵袭性及远处转移风险。Chang等最近报道,循环EBV-DNA拷贝数与PET/CT中的肿瘤TLG、淋巴结TLG、总TLG均明显有关;MTV、SUV、肿瘤TLG与TNM分期密切相关。部分研究证实了治疗前TLG预测生存的价值,TLG值高于中位水平预示着更差的OS、LRFS、DFE^[13]。在Wang等^[14]的研究中阐述了治疗后的SUV值可以监测肿瘤的复发。本研究发现SUV_{max}-T与T分期、临床分期存在相关性,说明原发灶的SUV值越高,意味着更晚的T分期、临床分期;SUV_{max}-N与N分期、临床分期存在相关性,暗示颈部转移淋巴结的SUV值越高,N分期及临床分期越晚;SUV_{max}与T分期、N分期、临床分期存在相关性;SUV_{max}值与临床分期均是反映鼻咽癌患者预后的独立因素,它们存在相关性,可能因为它们均与肿瘤负荷相关。因此,在鼻咽癌患者中,原发灶及颈部淋巴的SUV_{max}值是结合代谢、解剖图像的临床参数,可以作为临床分期的有利补充,指导患者选择最佳治疗方式和判断治疗反应及预后,具有重要的临床意义。

当然,本研究存在不足之处:①样本量相对较小且有限;②所有测量记录从单个医疗中心获取;③由于研究时间较短,未做生存随访。未来将设计大规模、标准化、多中心临床研究进一步证实相关结论。总之,鼻咽癌患者PET/CT中的SUV_{max}-T、SUV_{max}-N、SUV_{max}与临床分期之间存在一定的相关性,可以作为临床分期的有利补充。

参考文献

- [1] CAO S M, SIMONS M J, QIAN C N. The prevalence and prevention of nasopharyngeal carcinoma in China[J]. Chin J Cancer, 2011, 30: 114-119.
- [2] 王瑞芝,樊锐太. 肿瘤放射治疗学[M]. 北京:人民卫生出版社, 2009.
- [3] WEI J, PEI S, ZHU X. Comparison of (18)F-FDG PET/CT, MRI and SPECT in the diagnosis of local residual/recurrent nasopharyngeal carcinoma: a meta-analysis[J]. Oral Oncol, 2015, 52: 11-17.
- [4] VELLAYAPPAN B A, SOON Y Y, EARNEST A,

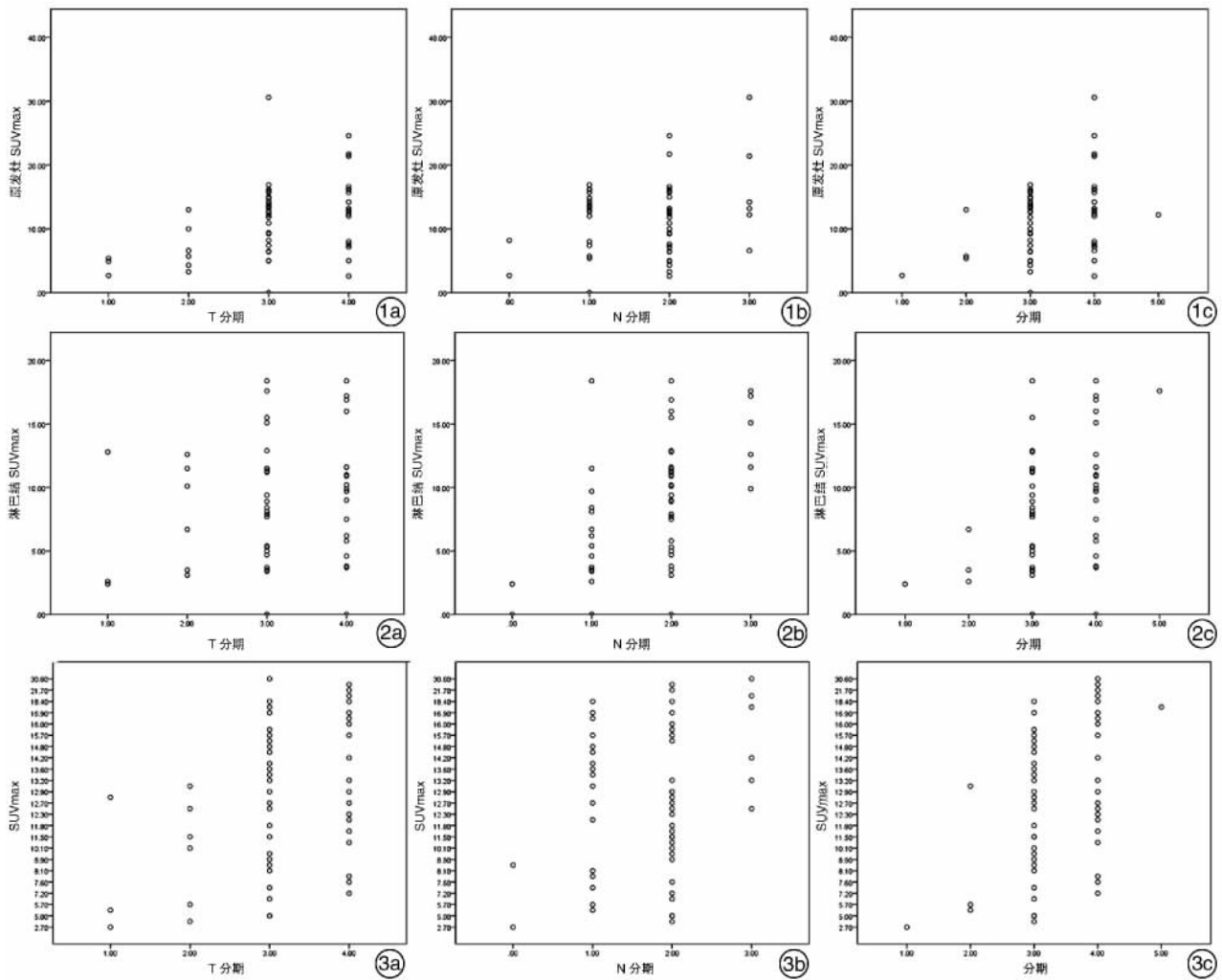


图 1 SUVmax-T 与分期的相关性 1a:SUVmax-T 与 T 分期;1b:SUVmax-T 与 N 分期;1c:Vmax-T 与临床分期; 图 2 SUVmax-N 与分期的相关性 2a:SUVmax-N 与 T 分期;2b:SUVmax-N 与 N 分期;2c:SUVmax-N 与临床分期; 图 3 SUVmax 与分期的相关性 3a:SUVmax 与 T 分期;3b:SUVmax 与 N 分期;3c:SUVmax 与临床分期。

et al. Accuracy of (18) F-fluorodeoxyglucose-positron emission tomography/computed tomography in the staging of newly diagnosed nasopharyngeal carcinoma: a systematic review and meta-analysis[J]. Radiol Oncol,2014,48:331-338.

[5] XU G Z, GUAN D J, HE Z Y. (18)FDG-PET/CT for detecting distant metastases and second primary cancers in patients with head andneck cancer. A meta-analysis[J]. Oral Oncol,2011,47:560-565.

[6] CHANG K P,CHANG Y T,WU C C, et al. Multiplexed immunobead-based profiling of cytokine markers for detection of nasopharyngeal carcinoma and prognosis of patient survival[J]. Head Neck,2011,33: 886-897.

[7] SU M,ZHAO L,WEI H, et al. 18F-fluorodeoxyglucose positron emission tomography for predicting tumor response toradiochemotherapy in nasopharyngeal carcinoma [J]. Strahlenther Onkol,2015,191:642-648.

[8] SHI Q, YANG Z, ZHANG Y, et al. Adding maximum standard uptake value of primary lesion and

lymph nodes in 18F-fluorodeoxyglucose PET helps predict distant metastasis in patients with nasopharyngeal carcinoma [J]. PLoS One, 2014, 9: e103153 - e103153.

[9] XIAO W, XU A, HAN F, et al. Positron emission tomography-computed tomography before treatment is highly prognostic of distantmetastasis in nasopharyngeal carcinoma patients after intensity-modulated radiotherapy treatment: a prospective study with long-term follow-up[J]. Oral Oncol,2015,51:363-369.

[10] ALLAL A S, SLOSMAN D O, KEBDANI T, et al. Prediction of outcome in head-and-neck cancer patients using the standardized uptake value of 2-[18F]fluoro-2-deoxy-D-glucose[J]. Int J Radiat Oncol Biol Phys, 2004, 59:1295-1300.

[11] SEOL Y M, KWON B R, SONG M K, et al. Measurement of tumor volume by PET to evaluate prognosis in patients with head and neck cancer treatedby

- Biochemistry, 2010,74:1869-1877.
- [20] COSTA D J, MARTEAU P, AMOUYAL M, et al. Efficacy and safety of the probiotic *Lactobacillus paracasei* LP-33 in allergic rhinitis: a double-blind, randomized, placebo-controlled trial (GA2LEN Study) [J]. *Eur J Clin Nutr*, 2014,68:602-607.
- [21] KAWASE M, HE F, KUBOTA A, et al. Effect of fermented milk prepared with two probiotic strains on Japanese cedar pollinosis in a double-blind placebo-controlled clinical study [J]. *Int J Food Microbiol*, 2009, 128:429-434.
- [22] LIN T Y, CHEN C J, CHEN L K, et al. Effect of probiotics on allergic rhinitis in Df, Dp or dust-sensitive children: a randomized double blind controlled trial [J]. *Indian Pediatr*, 2013, 50:209-213.
- [23] XIAO J Z, KONDO S, YANAGISAWA N, et al. Effect of probiotic *Bifidobacterium longum* BB536 [corrected] in relieving clinical symptoms and modulating plasma cytokine levels of Japanese cedar pollinosis during the pollen season. A randomized double-blind, placebo-controlled trial [J]. *J Investigational Allergol Clinical Immunology*, 2006,16:86-93.
- [24] SINGH A, HACINI-RACHINEL F, GOSONI M L, et al. Immune-modulatory effect of probiotic *Bifidobacterium lactis* NCC2818 in individuals suffering from seasonal allergic rhinitis to grass pollen: an exploratory, randomized, placebo-controlled clinical trial [J]. *Eur J Clin Nutr*, 2013,67:161-167.
- [25] LIN W Y, FU L S, LIN H K, et al. Evaluation of the effect of *Lactobacillus paracasei* (HF, A00232) in children (6-13 years old) with perennial allergic rhinitis: a 12-week, double-blind, randomized, placebo-controlled study [J]. *Pediatr Neonatol*, 2014, 55: 181-188.
- [26] ISHIDA Y, NAKAMURA F, KANZATO H, et al. Clinical effects of *Lactobacillus acidophilus* strain L-92 on perennial allergic rhinitis: a double-blind, placebo-controlled study [J]. *J Dairy Sci*, 2005,88:527-533.
- [27] GOTOH M, SASHIHARA T, IKEGAMI S, et al. Efficacy of oral administration of a heat-killed *Lactobacillus gasseri* OLL2809 on patients of Japanese cedar-pollinosis with high Japanese-cedar pollen-specific IgE [J]. *Biosci Biotechnol Biochem*, 2009,73:1971-1977.
- [28] NOVERR M C, HUFFNAGLE G B. The 'microflora hypothesis' of allergic diseases [J]. *Clin Exp Allergy*, 2005,35:1511-1520.
- [29] 朱鲁平,张清照,嶋田贵志,等. 肠球菌属益生菌对实验性变应性鼻炎的抗变态反应作用研究 [J]. *中华耳鼻咽喉头颈外科杂志*, 2013,48(7):555-562.
- [30] 张清照,嶋田贵志,程雷. 肠球菌属益生菌提取物 LFK 对变应性鼻炎小鼠血清 IL-12 的影响 [J]. *山东大学耳鼻喉眼学报*, 2014,28(3):7-9.
- [31] 张清照,朱鲁平,程雷. 益生菌对变应性疾病的防治作用 [J]. *中华耳鼻咽喉头颈外科杂志*, 2013,48(7):604-608.
- [32] 乔巍,冯坤,罗庆,等. 益生菌治疗变应性鼻炎的研究现状 [J]. *临床耳鼻咽喉头颈外科杂志*, 2015,29(12):1140-1142.
- [33] WASSENBERG J, NUTTEN S, AUDRAN R, et al. Effect of *Lactobacillus paracasei* ST11 on a nasal provocation test with grass pollen in allergic rhinitis [J]. *Management Decision*, 2011,41:565-573.
- [34] WALKER W A. Mechanisms of action of probiotics [J]. *Clin Infect Dis*, 2008,46:S87-91.
- [35] NOVERR M C, HUFFNAGLE G B. Does the microbiota regulate immune responses outside the gut [J]? *Trends Microbiol*, 2004,12:562-568.
- [36] IVORY K, WILSON AM, SANKARAN P, et al. Oral delivery of a probiotic induced changes at the nasal mucosa of seasonal allergic rhinitis subjects after local allergen challenge: a randomised clinical trial [J]. *PLoS One*, 2013,8:e78650-e78650.
- [37] 孙雯娟,张波,李大魁,等. 益生菌制剂的发展现状与临床应用进展 [J]. *中国医院药学杂志*, 2015,35(9):850-857.

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- chemo-radiation therapy [J]. *Acta Oncol*, 2010, 49: 201-208.
- [12] CHAN S C, CHANG T C, WANG H M, et al. Prediction for distant failure in patients with stage M0 nasopharyngeal carcinoma: the role of standardized uptake value [J]. *Oral Oncol*, 2008,45:52-58.
- [13] MA B B, KING A, LO Y M, et al. Relationship between pretreatment level of plasma Epstein-Barr virus DNA, tumor burden, and metabolic activity in advanced nasopharyngeal carcinoma [J]. *Int J Radiat Oncol Biol Phys*, 2006,66:714-720.
- [14] WANG W Y, TWU C W, LIN W Y, et al. Plasma Epstein-Barr virus DNA screening followed by ¹⁸F-fluoro-2-deoxy-D-glucose positron emission tomography in detecting posttreatment failures of nasopharyngeal carcinoma [J]. *Cancer*, 2011,117:4452-4459.

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