[DOI]10.12016/j.issn.2096-1456.202550105

·综述·

唾液腺黏膜相关淋巴组织淋巴瘤的研究进展

董佳琪[1]，　赵惠婷[1,2]，　罗观发[1]，　杨细虎[1]
1.江苏大学附属医院口腔科，江苏 镇江(212001)；　2.锦州医科大学口腔医学院，辽宁 锦州(121001)

【摘要】　唾液腺黏膜相关淋巴组织淋巴瘤(salivary gland mucosa-associated lymphoid tissue lymphoma，SGML)是边缘区B细胞淋巴瘤的一个亚型，发生于黏膜组织淋巴结外。SGML的发病与淋巴上皮性唾液腺炎(lymphoepithelial sialadenitis，LESA)和干燥综合征(Sjögren's syndrome，SS)以及幽门螺杆菌、丙型肝炎病毒、EB病毒、人类嗜T淋巴细胞病毒等免疫和慢性感染以及遗传因素密切相关。SGML最常见的部位是腮腺，其次是下颌下腺、小唾液腺和舌下腺；其多见于中老年女性，且患者通常伴有自身免疫性疾病如干燥综合征或类风湿性关节炎等。SGML可通过临床表现、影像学以及组织病理学进行诊断，且组织病理学活检仍是SGML确诊的主要手段。传统治疗方法包括抗感染治疗、手术联合放化疗。近年来，一些新型治疗方法如Bruton 酪氨酸激酶(Bruton tyrosine kinase，BTK)抑制剂、程序性细胞死亡蛋白-1(programmed cell death protein-1，PD-1)抑制剂等针对复发性或难治性SGML有效，但尚需更多临床试验数据支持。因此，目前对SGML的最佳治疗尚未明确，应将肿瘤的部位、分期、临床特征和患者的整体健康状况结合，从而制订个体化治疗方案。SGML进展缓慢，总体预后较好，但是该病病情反复、治疗周期长、复发率较其他黏膜相关淋巴组织淋巴瘤高，还有可能引起严重并发症，因此，定期观察随访对其预后十分重要。本文对SGML的病因、诊断、治疗及预后等方面进行综述，以期为临床诊疗提供参考，从而提高患者的生存率。

【关键词】　唾液腺黏膜相关淋巴组织淋巴瘤；　黏膜相关淋巴组织淋巴瘤；　唾液腺恶性肿瘤；　淋巴上皮性唾液腺炎；　干燥综合征；　淋巴瘤；　发病机制
【中图分类号】　R78　【文献标志码】　A　【文章编号】　2096-1456(2025)09-0809-10
【引用著录格式】　董佳琪，赵惠婷，罗观发，等. 唾液腺黏膜相关淋巴组织淋巴瘤的研究进展[J]. 口腔疾病防治, 2025, 33(9): 809-818. doi:10.12016/j.issn.2096-1456.202550105.

微信公众号

Research progress on salivary gland mucosa-associated lymphoid tissue lymphoma

DONG Jiaqi[1], ZHAO Huiting[1,2], LUO Guanfa[1], YANG Xihu[1].　1. Department of Stomatology, Affiliated Hospital of Jiangsu University, Zhenjiang 212001, China；　2. School of Stomatology, Jinzhou Medical University, Jinzhou 121001, China
Corresponding author: YANG Xihu, Email: yangxihu1981@126.com

【Abstract】　Salivary gland mucosa-associated lymphoid tissue lymphoma (SGML) is a subvariety of marginal zone B-cells that occurs outside of mucosal lymph nodes. The onset of SGML is closely related to immunity, chronic infections, and genetic factors, such as lymphoepithelial sialadenitis (LESA) and Sjogren's syndrome (SS), as well as Helicobacter pylori, hepatitis C virus, Epstein - Barr virus, and human T-lymphocytic virus. The most common site of SGML is the parotid gland, followed by the submandibular gland, small salivary gland, and sublingual gland. SGML is more common in middle-aged and elderly women, and patients often have autoimmune diseases, such as Sjogren's syndrome or rheumatoid arthritis. SGML can be diagnosed through clinical manifestations, imaging, and histopathology, but histopathological biopsy remains the main method for confirming SGML. Traditional treatment methods include anti-infective therapy and surgery combined with radiation or chemotherapy. In recent years, some new treatment methods, such as Bruton tyrosine kinase (BTK) inhibitors and programmed cell death protein-1 (PD-1) inhibitors, have been effective

【收稿日期】2025-03-13；　【修回日期】2025-05-13
【基金项目】国家自然科学基金面上项目 (82173380)
【作者简介】董佳琪，住院医师，本科，Email：dongjiaq0720@163.com
【通信作者】杨细虎，副主任医师，博士，Email: yangxihu1981@126.com

against recurrent or refractory SGML, but more clinical trial data are needed to support them. At present, the optimal treatment for SGML is not yet clear. Individualized treatment plans should be developed based on the location, staging, clinical characteristics, and overall health status of the patient. SGML progresses slowly and has a relatively good overall prognosis; however, the disease is recurrent, the treatment cycle is long, the recurrence rate is higher than that of other mucosa-associated lymphoid tissue lymphomas, and SGML may also cause other serious complications. Therefore, regular observation and follow-up are very important for its prognosis. This article reviews the etiology, diagnosis, treatment, and prognosis of SGML, with the aim of providing a reference for clinical diagnosis and treatment, and thus improve the survival rate of patients with SGML.

【Key words】 salivary gland mucosa-associated lymphoid tissue lymphoma; mucosa-associated lymphoid tissue lymphoma; salivary gland malignant tumor; lymphoepithelial sialadenitis; Sjögren's syndrome; lymphoma; pathogenesis

J Prev Treat Stomatol Dis, 2025, 33(9): 809-818.

【Competing interests】 The authors declare no competing interests.

This study was supported by the grants from National Natural Science Foundation of China (No. 82173380).

黏膜相关淋巴组织(mucosa-associated lymphoid tissue,MALT)淋巴瘤属于淋巴结外低度恶性B细胞型非霍奇金淋巴瘤(B-cell non-Hodgkin's lymphoma,B-NHL),约占非霍奇金淋巴瘤的5%~8%,仅次于弥漫性大B细胞淋巴瘤(diffuse large B cell lymphoma, DLBCL)和滤泡性淋巴瘤(follicular lymphoma, FL)[1]。根据第5版世界卫生组织(World Health Organization,WHO)造血及淋巴组织肿瘤分类,将MALT淋巴瘤归为边缘区淋巴瘤(marginal zone lymphoma,MZL)的4种亚型之一,其余为原发性皮肤MZL、淋巴结MZL及小儿MZL[2]。MALT淋巴瘤通常发生在无生发中心的组织,最常受影响的器官是胃,也可见于唾液腺、甲状腺、肺、眼附属器等。不同部位的MALT淋巴瘤具有不同的临床表现,如胃MALT淋巴瘤患者常表现为腹痛、胃出血等[3],眼附属器MALT淋巴瘤多见眼球突出、结膜充血等症状[4]。

近年来,随着放射及病理学的发展与进步,对唾液腺黏膜相关淋巴组织淋巴瘤(salivary gland mucosa-associated lymphoid tissue lymphoma,SGML)的认识不断提高[5]。SGML原发于唾液腺的黏膜相关淋巴组织,好发于中老年患者,女性为主,通常合并自身免疫性疾病或慢性感染,其多发生于腮腺,其次为颌下腺,舌下腺及小唾液腺受累较少[6]。SGML尚无典型的临床表现,若合并干燥综合征(Sjögren's syndrome,SS)可出现口干、眼干、唾液腺肿大等症状。本文就SGML的病因、诊断、治疗等方面进行综述,旨在为临床实践提供更全面的参考。

1　SGML的病因及发病机制

1.1　自身免疫性疾病

自身免疫性疾病与MALT淋巴瘤之间存在密切关联[7],如甲状腺MALT淋巴瘤与桥本甲状腺炎显著相关[8]。而SGML常与淋巴上皮性唾液腺炎(lymphoepithelial sialadenitis,LESA)和干燥综合征有关[9]。LESA可能是SS的局部表现之一,也可表现为孤立的唾液腺病变。特征是腺泡萎缩、淋巴细胞浸润、导管增生和上层肌上皮岛形成[10]。LESA中的慢性炎症及淋巴细胞浸润为SGML的发生提供微环境,可能是SGML的前期病变[11]。MALT淋巴瘤占SS相关淋巴瘤的65%[12],其次是DLBCL和淋巴结MZL。据一项国际淋巴瘤流行病学联盟的研究显示,原发性干燥综合征(primary Sjögren's syndrome,pSS)患者患MZL风险增加约30倍[13]。Hernández-Molina等[14]回顾性分析414例发生血液系统恶性肿瘤的pSS患者,发现共376例(91%)患有B细胞淋巴瘤,其中MALT淋巴瘤占47.5%,且唾液腺是主要受累部位,证实了SS与SGML之间的关联。

1.2　感染因素

与胃或眼附属器MALT淋巴瘤不同,SGML极少与幽门螺杆菌(*helicobacter pylori*, *Hp*)[15]或衣原体感染直接相关[16],但部分病例可能与丙型肝炎病毒(hepatitis C virus,HCV)感染存在间接关联。HCV是一种RNA病毒,流行病学研究表明,HCV感染者患B-NHL风险显著增高[17]。目前,广泛认可的HCV相关淋巴瘤的发生机制主要有两种:一种是B细胞中的活性HCV复制损害细胞周期并通过

HCV相关蛋白表达介导淋巴瘤发生；另一种是慢性抗原刺激，HCV包膜蛋白E2与B细胞和B细胞受体（B cell receptor，BCR）上的CD81受体结合，导致边缘B细胞的慢性刺激[18]。除HCV外，EB病毒[19]、人类嗜T淋巴细胞病毒（human T-cell lymphotropic virus，HTLV）[20]也和SGML发生相关。

1.3　遗传学异常

SGML常与复发性染色体畸变，如三体、扩增和缺失、染色体易位、体细胞点突变等有关[21]。目前发现与MALT淋巴瘤发病相关的最常见染色体易位是t（1；14）（p22，q32），t（11；18）（q21，q21），t（14；18）（q32，q21）和t（3；14）（p14.1，q32）[22]。遗传畸变的频率取决于疾病的原发部位[23]。

t（1；14）（p22，q32）易位发生在1%~2%的MALT淋巴瘤中，且目前仅在胃、肺和皮肤中发现。t（11；18）（q21，q21）是最早发现的染色体易位，主要与自身抗原有关，通常发生在肺和胃，在其他部位很少见，目前仅见于MALT淋巴瘤[24]。t（14；18）（q32，q21）易位最常见于肺、眼附件、皮肤和唾液腺的病变[22]。除易位外，3、12、18号染色体数目异常亦是MALT淋巴瘤的重要遗传学特征[25]。SGML的典型异常染色体为3号染色体，若同时检出12或18号染色体异常则提示高级别转化风险，应加强随访[26]。

1.4　SGML的分子发病机制

如上所述，SGML主要涉及t（14；18）（q32，q21）/IgH-MALT1与t（X；14）（p11，q32）易位。t（14；18）（q32，q21）易位使黏膜相关淋巴组织淋巴瘤易位蛋白1（mucosa-associated lymphoid tissue lymphoma translocation protein 1，MALT1）基因被14号染色体上的免疫球蛋白重链（immunoglobulin heavy chain，IGH）增强子控制，导致MALT1的表达失调，进而激活核因子κB（nuclear factor kappa-B，NF-κB）信号通路[27]。t（X；14）（p11，q32）易位导致Xp11.4处的G蛋白偶联受体34（G-protein coupled receptor 34，GPR34）基因与14q32处的IGH增强子并置，导致GPR34过表达[28]。GPR34内源性配体为溶血磷脂酰丝氨酸（lysophosphatidylserine，lysoPS），是一种在炎症或损伤组织中由磷脂酰丝氨酸（phosphatidylserine，PS）水解产生的脂质介质。在伴SS的唾液腺中，lysoPS可能持续生成，并通过结合GPR34激活NF-κB信号通路[29]。

总之，SGML的发病是慢性炎症刺激、遗传学异常及信号通路失调共同作用的结果（图1）。其分子机制为靶向治疗提供了理论基础，同时说明控制炎症在防止SGML进展的重要性。

2　SGML的诊断及鉴别诊断

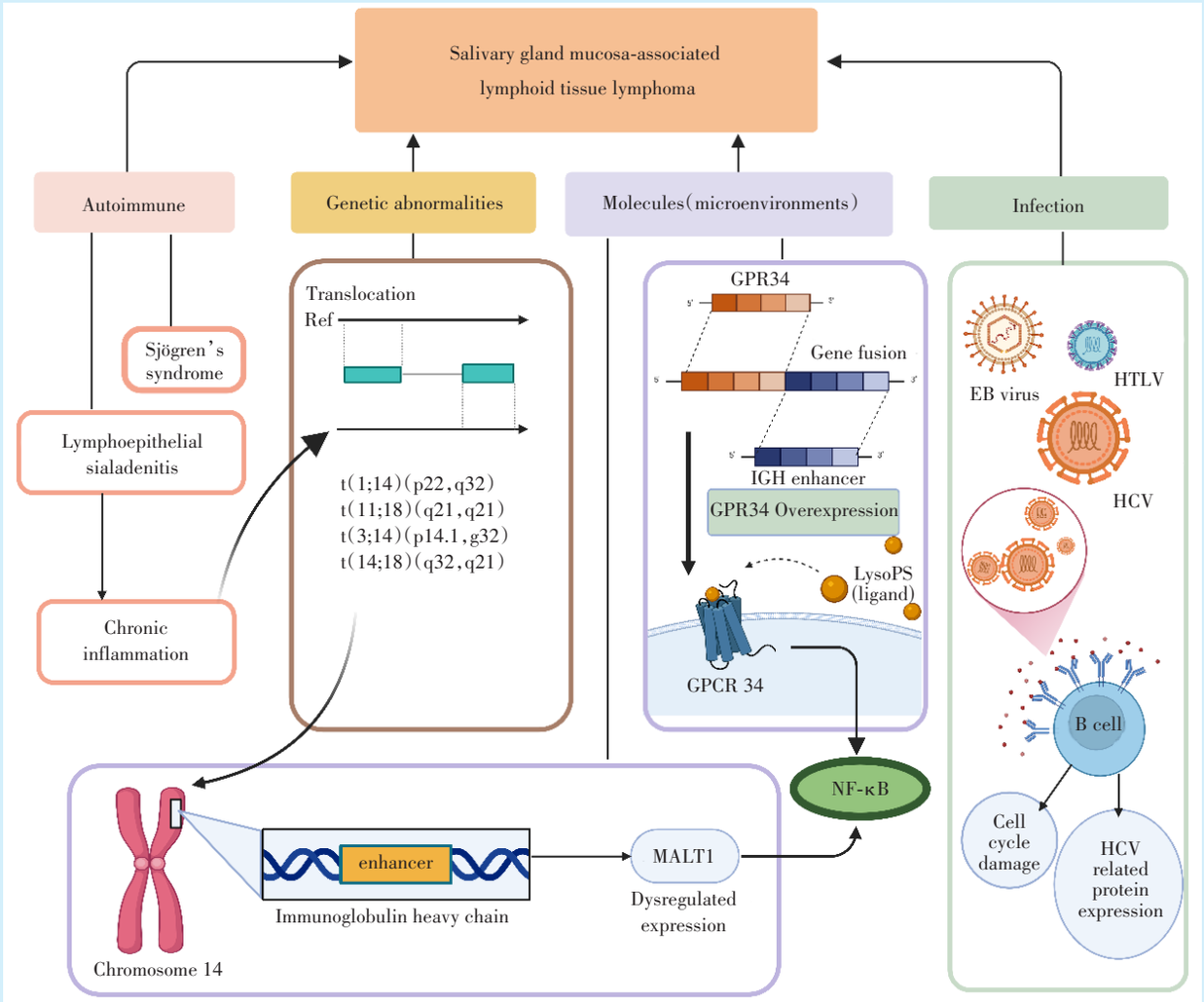
目前，SGML的诊断尚无统一标准，应结合临床表现、影像学、病理学、细胞学及实验室检查综合分析。

2.1　SGML的临床表现

SGML起病隐匿，病史较长，大部分患者仅表现为单侧/双侧唾液腺局部无痛性进行性肿胀，肿块表皮色泽、温度正常，可伴有淋巴结肿大等非特异性炎症反应[30-31]。在CNKI、PubMed数据库（2015-2024年）对SGML相关文献进行全面检索，搜索词包括“salivary gland mucosa-associated lymphoid tissue lymphoma”、“case report”，排除成组病例后纳入18篇SGML相关文献。提取患者性别、年龄、发病部位等进行分析。结果显示患者平均年龄为52岁，男女比例为5∶13，这可能与女性SS易感性更高相关。发病部位依次为腮腺（30%）、舌下腺（15%）、颌下腺（15%）、硬腭（15%）、下唇（10%）、舌（10%）及副腮腺（5%）。18位患者主诉均为无痛性肿块，发生在硬腭或舌根者可伴有咀嚼不适或吞咽困难。平均随访时间为（21.6±12）月（范围6~60个月），失访率16.7%。治疗方案包括单纯手术或手术合并放/化疗，仅1例在接受手术及化疗3年后复发，说明SGML总体预后较好。

2.2　SGML的影像学检查

超声是诊断唾液腺肿物时临床首选的影像学检查[32]。SGML超声可表现为两种：正常软组织包绕显著低回声占位，可能包含纤维条纹，如细小的线性回声带或较宽、密集的回声带；多个小的低回声实性结节，穿插厚度不一的线性回声分隔，从而形成“龟壳”样外观[33]。若合并淀粉样蛋白沉积则显示出非典型影像学表现：T2WI低信号和T1WI等值至轻微高信号，无显著弥散限制[34]。随着多参数方案的应用，MRI的最新技术被证明能够区分良性和恶性腮腺病变，动态对比增强MRI（dynamic contrast-enhanced magnetic resonance imaging，DCE-MRI）可能有助于区分腮腺良性淋巴上皮病变（lymphoepithelial lesion，LEL）与SGML[35]。然而，由于样本量小，DCE-MRI目前只能作为辅助手段，明确诊断仍然需要病理确认。PET/CT是基于注射放射性药物（示踪剂）广泛用于肿瘤的检查。最常用的PET示踪剂是氟代脱氧葡萄糖（fludeoxyglu-



HTLV: human T-cell lymphotropic virus; MALT1: mucosa-associated lymphoid tissue lymphoma translocation protein 1; GPCR: G-protein coupled receptor; GPR: G-protein receptor; HCV: Hepatitis C Virus; NF-κB: nuclear factor kappa-B

Figure 1　Pathogenesis of salivary glands mucosa-associated lymphoid tissue lymphoma

图 1　唾液腺黏膜相关淋巴组织淋巴瘤的相关发病机制

cose,FDG)。FDG-PET/CT在高级别淋巴瘤中的有效性已得到认可[36]。FDG在不同位置亲和力不同,故FDG-PET/CT能够显示pSS的全身性表现[37],当pSS患者怀疑有淋巴瘤需要活检时,FDG-PET/CT可以引导到最佳活检位置[36]。

2.3　SGML的病理学检查

目前,组织病理学活检仍是SGML确诊的主要手段。但由于SGML缺乏特异性的免疫表型,需要与FL、慢性淋巴细胞白血病、套细胞淋巴瘤等进行鉴别后,结合免疫组织化学结果与形态学表现诊断。SGML的HE染色主要表现为不同程度的腺泡萎缩;部分可见囊性扩张;淋巴细胞弥漫性浸润,绝大多数为中心细胞样细胞、单核样B细胞和小淋巴细胞;反应性淋巴滤泡增生,肿瘤细胞浸润淋巴滤泡;腺上皮破坏,部分可见LEL[38]。免疫组化检测能够对SGML进行抗原检测进而评估淋巴瘤的病理分型,SGML相关抗体通常为B细胞标志物,即CD20、CD79a、CD5、CD10、CD23、PAX-5和CD43等[38-41]。既往文献报道的患者免疫组化指标情况详见表1。本病尚未发现特征性免疫表型,既往SGML免疫标志物显示:SGML常表达CD20、CD79a、Bcl-2、PAX5,CD21在滤泡树突细胞(follicular dendritic cell,FDC)网中呈阳性,而CD3、CD5、CD10、CD23、Cyclin-D1多为阴性。同时,Ki-67增殖指数均<45%,符合SGML低度恶性特征。

表1　近10年报道的18例唾液腺黏膜相关淋巴组织淋巴瘤免疫组化标志物

Table 1　Eighteen cases of salivary glands mucosa-associated lymphoid tissue lymphoma immunohistochemical markers reported in the last decade

Number	Positive indicators	Negative indicators	References
1	CD20，Bcl-2	CD3, CD5, CD10，CD23, Cyclin-D1 , Bcl-1, Lambda	[42]
2	CD20, CD79a, CD10, Bcl-2, CD3, CD5, IgG, IgG4, Ki-67（10%）, CD138, Kappa, lambda	N/A	[43]
3	N/A	N/A	[44]
4	CD20，Kappa	CD5, CD10, CD23, lambda	[45]
5	CD20	N/A	[46]
6	CD20, CD3, CD5	Cyclin-D1, CD10, CD23	[47]
7	CD20, CD79a, PAX5, CD43, Bcl-2, CD23	CD3, CD5, CD10, MUM1, Bcl-6，Cyclin-D1，CD23	[48]
8	Bcl-2, CD20, CD43，MUM1，Ki-67（8%-10%）	Bcl-6，Cyclin-D1，CD10，CD3, CD5	[49]
9	CD20, CD79a, , Bcl-2, Ki-67（10%）	CD10，Cyclin-D1，CD3, CD5, CD23	[50]
10	CD20，Bcl-2，Ki-67，lambda	CD3, Cyclin-D1，Kappa	[51]
11	CD20，Bcl-2，Ki-67（20%）	lambda	[52]
12	CD20, CD79a, Bcl-2, CD3, Bcl-6，CD4, CD8	CD10，CD56，Cyclin-D1	[53]
13	N/A	N/A	[54]
14	CD20, CD79a, CD38，CD23, CD21，CD3，CD5，Bcl-2, Cytokeratin, Ki-67（15%）, lambda	Cyclin-D1，Kappa	[55]
15	CD20，Bcl-2	CD3, CD5, CD10，Cyclin-D1，EBER	[56]
16	N/A	N/A	[57]
17	CD20, CD19, PAX5, CD22, MNDA, Bcl-2, CD43, c-myc, MUM1, CD30, CD21, CD23, CD35, p53, IgG4, Ki-67（40%），PEPCK	CD3，CD5，CD10，Bcl-6，Cyclin-D1，IgD, LEF1, CD4, CD8	[58]
18	CD20, CD23, CD138, Kappa	N/A	[59]

Bcl: B-cell lymphoma; N/A: not applicable; CD: cluster of differentiation; Ig: immunoglobulin; MUM1: multiple myeloma oncogene 1; PAX5: paired box 5; MNDA: myeloid nuclear differentiation antigen; c-myc: cellular myelocytomatosis oncogene; EBER: epstein-barr virus-encoded small RNA; LEF1: lymphoid enhancer factor 1

2.4　SGML的细胞学检查

细针穿刺（fine needle aspiration，FNA）是唾液腺病变术前评估的重要方法，与切除活检相比更容易进行、更安全[60]。但对于罕见的唾液腺肿瘤和常见肿瘤的罕见组织学变异，FNA的准确性有待考量，所以SGML很难单独通过FNA诊断[61]。与FNA相比，超声引导下空芯针活检并发症发生率更低[62]，精确度更高，并可确定腮腺肿瘤的类型，进而指导临床医生精准治疗，降低术后并发症[63]。

2.5　SGML的实验室检查

基于SGML的病因学特点，完善血常规、生化检查、肝肾功能检查、乙肝等传染病检查也是必要的[64]。贫血是最常见的血液学异常，其次是白细胞减少和血小板减少，部分恶性肿瘤患者的血清蛋白电泳、血清游离轻链（serumfree light chain，sFLC）检测、血清β2微球蛋白检查结果也可能出现异常[65]。研究发现，干燥综合征疾病活动指数、冷球蛋白血症和浸润灶评分是pSS患者MALT淋巴瘤的预测因子[66]。

2.6　SGML的鉴别诊断

SGML的临床表现缺乏特异性，需与其他恶性淋巴瘤、慢性唾液腺炎、IgG4相关疾病及良性肿瘤/瘤样病变（如多形性腺瘤、良性淋巴上皮囊肿等）鉴别[67]。组织病理学及免疫组化检查为诊断金标准，若CD5（+）、CD10（+）、Bcl-2强阳性需与FL鉴别诊断；Bcl-2、Bcl-6、MUM1阳性需与DLBCL鉴别诊断。分子遗传学检查对SGML某些遗传学异常有较高特异性，但明确诊断仍需组织病理学检查结果支持。

3　SGML的治疗与预后

3.1　SGML的治疗

目前，针对SGML的最佳治疗尚未明确定义，可采用手术切除、化学治疗、放射治疗、抗感染治疗单独或联合使用[68]。治疗方式因人而异，也应考虑到肿瘤的部位、分期、临床特征和患者的整体健康状况[69]。

根据中国淋巴瘤治疗指南（2023年版），早期SGML（Ann Arbor Ⅰ期及Ⅱ期）通常采用手术切除，如切缘阳性，术后应采用受累部位放疗（involved site radiotherapy，ISRT），若切缘阴性可以选择观察[70]。放疗标准剂量为24~30 Gy，根据肿瘤的体积及部位调整用量。但需要注意的是，腮腺区放疗可能会进一步损害腺体的功能并加重pSS患者的口干症状。

采用腺体部分切除术对于治疗较局限的低级别SGML疗效显著，但同时会导致瘢痕形成和外观的长期改变；其他潜在风险包括面神经的暂时性或永久性损伤、感觉丧失、耳颞神经综合征、伤口感染、唾液囊肿和瘘管。有研究表明，针对局限型SGML，经*HP*根除方案（如质子泵抑制剂、克拉霉素、阿莫西林和甲硝唑）后达到完全缓解[71]。说明一线抗生素治疗可能有益于某些局限型SGML患者，避免放疗或化疗导致的不良反应。

晚期SGML（Ann Arbor Ⅲ期及Ⅳ期）无功能障碍者可选择观察，若伴随发音吞咽困难等症状及其他部位功能障碍，可选择ISRT，以利妥昔单抗为基础的化疗是首选方案，利妥昔单抗用于治疗SS伴SGML患者不仅可以控制淋巴瘤，还可降低SS的活性[72]。其他化疗药物还包括苯达莫司汀、环磷酰胺、多柔比星、长春新碱和泼尼松等。病变范围广泛的复发患者，若无治疗指征可选择观察，有治疗指征患者可一线治疗达到完全缓解后选择观察或利妥昔单抗维持[70]。

近年来，揭示惰性淋巴瘤的失调途径和免疫抗肿瘤反应方面的基础研究取得了进展[73]。据美国国家综合癌症网络（National Comprehensive Cancer Network，NCCN）（2021年版）报道，Bruton酪氨酸激酶（Bruton tyrosine kinase，BTK）抑制剂如伊布替尼和泽布替尼已被列为MZL二线及老年体弱患者的首选方案，在一项针对60例MZL患者的多中心Ⅱ期研究中，伊布替尼客观缓解率（objective response rate，ORR）为48%，而另一项65例MZL患者的Ⅱ期研究中，泽布替尼ORR为68%，且与伊布替尼相比，泽布替尼不良反应更少。厄布利塞是唯一获得美国食品药物管理局（Food and Drug Administration，FDA）批准用于MZL的PI3K抑制剂。在一项纳入69例复发/难治性惰性MZL患者的试验中，厄布利塞用于MALT淋巴瘤的ORR为45%，已被纳入MZL的后续治疗方案[74]。此外，免疫检查点如程序性细胞死亡蛋白-1（programmed cell death protein-1，PD-1）抑制剂可能对特定亚型DLBCL有效，但对SGML疗效的研究尚处于早期阶段[75]。此类非化疗药物治疗方案有望为复发性/难治性SGML患者提供更多选择。

3.2　SGML的预后

SGML进展缓慢，总体预后较好，10年生存率可达90%[76]。Ⅰ期或Ⅱ期SGML患者的生存率不受初始治疗的影响，接受受累腺体完全切除的患者与部分切除患者的总生存期或无进展生存期无差异[77]。不同部位MALT淋巴瘤的预后存在差异。在一项评估229例胃MALT淋巴瘤患者接受放疗的预后研究中，10年总生存期达92.8%[78]。眼附属器MALT淋巴瘤复发率更高[79]。少数SGML可发生高级别转化，5%~10%的SGML可转化为DLBCL，合并SS患者的转化风险更高[80]。此外，高龄、β2-微球蛋白、贫血、造血系统和淋巴结受累也是影响SGML预后的因素[81]。

目前，生活质量评价已成为衡量癌症疗效的评价标准之一。SGML具有病情反复、治疗周期长、复发率高等特点，易诱发患者焦虑、抑郁等负面情绪，尤其是晚期及播散型SGML常出现淋巴瘤相关全身症状（发热、盗汗等）、多器官受累、严重口干、眼干[67]，临床医师需制定个性化治疗方案，治疗SGML的同时兼顾患者的生活质量。

4　小　结

迄今为止，SGML的分子发病机制研究虽已取得一定进展，但仍存在局限性，如NF-κB、BCR等信号通路在SGML中的协同作用尚未完全阐明，肿瘤微环境与SGML的相互作用尚需深入探讨。其次，SGML缺乏典型的临床表现，在临床上可能与系统性硬化症、IgG4相关性疾病、唾液腺肿瘤、良性淋巴上皮病变相混淆，导致误诊或延误治疗，影响预后。因此，早期诊断对SGML的治疗至关重要。目前确诊SGML主要依赖于组织病理学检查或FNA，创伤较大，可能导致出血、神经损伤或涎瘘，因此，无创或微创的早期诊断技术（如液体活检、超声弹

性成像、唾液生物标志物检测等)的研究至关重要。最后,目前对SGML的治疗主要集中在手术和放化疗,对唾液腺损伤较大,因此,提高放化疗的疗效、减少毒副作用、制定个性化治疗方案是未来亟待解决的问题。尽管BTK抑制剂对B细胞恶性肿瘤有效,但持续使用BTK抑制剂可能导致BTK结合位点(半胱氨酸481)发生突变[82]。PD-1抑制剂在SGML中的研究目前仍处于早期探索阶段[83],尚需更多临床试验数据支持,未来研究应聚焦在PD-1抑制剂与放化疗或靶向药物联合治疗方案和生物标志物的精准筛选方面,以突破现有研究瓶颈。

【Author contributions】 Dong JQ conceptualized and wrote the article. Zhao HT and Luo GF collected the references, revised the article. Yang XH conceptualized the article, guided and critically reviewed the article structures. All authors read and approved the final manuscript.

参考文献

[1] Uhl B, Prochazka KT, Fechter K, et al. Impact of the microenvironment on the pathogenesis of mucosa-associated lymphoid tissue lymphomas[J]. World J Gastrointest Oncol, 2022, 14(1): 153-162. doi: 10.4251/wjgo.v14.i1.153.

[2] Alaggio R, Amador C, Anagnostopoulos I, et al. The 5th edition of the world health organization classification of haematolymphoid tumours: lymphoid neoplasms[J]. Leukemia, 2022, 36(7): 1720-1748. doi: 10.1038/s41375-022-01620-2.

[3] Ishikawa E, Nakamura M, Satou A, et al. Mucosa-associated lymphoid tissue (MALT) lymphoma in the gastrointestinal tract in the modern era[J]. Cancers(Basel), 2022, 14(2): 446. doi: 10.3390/cancers14020446.

[4] McGrath LA, Ryan DA, Warrier SK, et al. Conjunctival lymphoma [J]. Eye(Lond), 2023, 37(5): 837-848. doi: 10.1038/s41433-022-02176-2.

[5] Quintanilla-Martinez L, Fend F. Turning up the heat on salivary gland MALT lymphoma[J]. Blood, 2022, 139(14): 2094-2096. doi: 10.1182/blood.2021012624.

[6] Zhang SL, Ma SR, Mao L, et al. One case of sublingual gland mucosa-associated lymphoid tissue lymphoma[J]. Oral Oncol, 2024, 148: 106648. doi: 10.1016/j.oraloncology.2023.106648.

[7] Dong Y, Wang T, Wu H. The role of cytokines from salivary gland epithelial cells in the immunopathology of Sjögren's syndrome[J]. Front Immunol, 2024, 15: 1443455. doi: 10.3389/fimmu.2024.1443455.

[8] Ghafouri AM, Alzaidi S, Al-Kaabi BB, et al. Thyroid B-cell lymphoma in the background of hashimoto's thyroiditis: a case report and literature review[J]. Cureus, 2024, 16(3): e57359. doi: 10.7759/cureus.57359.

[9] Verstappen GM, Pringle S, Bootsma H, et al. Epithelial-immune cell interplay in primary Sjögren syndrome salivary gland pathogenesis[J]. Nat Rev Rheumatol, 2021, 17(6): 333-348. doi: 10.1038/s41584-021-00605-2.

[10] Stergiou IE, Poulaki A, Voulgarelis M. Pathogenetic mechanisms implicated in sjögren's syndrome lymphomagenesis: a review of the literature[J]. J Clin Med, 2020, 9(12): 3794. doi: 10.3390/jcm9123794.

[11] Bende RJ, Janssen J, Beentjes A, et al. Salivary gland mucosa-associated lymphoid tissue-type lymphoma from sjögren's syndrome patients in the majority express rheumatoid factors affinity-selected for IgG[J]. Arthritis Rheumatol, 2020, 72(8): 1330-1340. doi: 10.1002/art.41263.

[12] Du W, Han M, Zhu X, et al. The multiple roles of B cells in the pathogenesis of sjögren's syndrome[J]. Front Immunol, 2021, 12: 684999. doi: 10.3389/fimmu.2021.684999.

[13] Wang SS, Vajdic CM, Linet MS, et al. B-cell NHL subtype risk associated with autoimmune conditions and PRS[J]. Cancer Epidemiol Biomarkers Prev, 2022, 31(5): 1103-1110. doi: 10.1158/1055-9965.EPI-21-0875.

[14] Hernández-Molina G, Kostov B, Brito-Zerón P, et al. Characterization and outcomes of 414 patients with primary SS who developed haematological malignancies[J]. Rheumatology(Oxford), 2022, 62(1): 243-255. doi: 10.1093/rheumatology/keac205.

[15] Kalin-Hajdu E, Bernier-Turmel F, Frost É, et al. *Helicobacter pylori* infection of the gastric mucosa and ocular adnexa-lack of association with ocular adnexal lymphoma[J]. Ophthalmic Plast Reconstr Surg, 2021, 37(3S): S1-S5. doi: 10.1097/IOP.0000000000001729.

[16] Vannata B, Pirosa MC, Bertoni F, et al. Bacterial infection-driven lymphomagenesis[J]. Curr Opin Oncol, 2022, 34(5): 454-463. doi: 10.1097/CCO.0000000000000886.

[17] Defrancesco I, Zerbi C, Rattotti S, et al. HCV infection and non-Hodgkin lymphomas: an evolving story[J]. Clin Exp Med, 2020, 20(3): 321-328. doi: 10.1007/s10238-020-00615-6.

[18] Alkrekshi A, Kassem A, Park C, et al. Risk of non-Hodgkin's lymphoma in HCV patients in the United States between 2013 and 2020: a population-based study[J]. Clin Lymphoma Myeloma Leuk, 2021, 21(11): e832-e838. doi: 10.1016/j.clml.2021.06.014.

[19] Rea B, Liu YC, Maguire A, et al. Genomic landscape of Epstein-Barr virus-positive extranodal marginal zone lymphomas of mucosa-associated lymphoid tissue[J]. Mod Pathol, 2022, 35(7): 938-945. doi: 10.1038/s41379-021-01002-6.

[20] Biernat MM, Wróbel T. Bacterial infection and non-Hodgkin B-cell lymphoma: interactions between pathogen, host and the tumor environment[J]. Int J Mol Sci, 2021, 22(14): 7372. doi: 10.3390/ijms22147372.

[21] Korona B, Korona D, Zhao W, et al. CCR6 activation links innate immune responses to mucosa-associated lymphoid tissue lymphoma development[J]. Haematologica, 2022, 107(6): 1384-1396. doi: 10.3324/haematol.2021.280067.

[22] Rodríguez-Sevilla JJ, Salar A. Recent advances in the genetic of MALT lymphomas[J]. Cancers(Basel), 2021, 14(1): 176. doi: 10.3390/cancers14010176.

[23] Bult JAA, Plaça JR, Haacke EA, et al. Low mutational burden of extranodal marginal zone lymphoma of mucosa-associated lym-

phoid tissue in patients with primary sjogren's syndrome[J]. Cancers(Basel), 2022, 14(4): 1010. doi: 10.3390/cancers14041010.

[24] Vela V, Juskevicius D, Dirnhofer S, et al. Mutational landscape of marginal zone B-cell lymphomas of various origin: organotypic alterations and diagnostic potential for assignment of organ origin[J]. Virchows Arch, 2022, 480(2): 403-413. doi: 10.1007/s00428-021-03186-3.

[25] Zhang C, Xia R, Gu T, et al. Clinicopathological aspects of primary mucosa-associated lymphoid tissue lymphoma of the salivary gland: a retrospective single-center analysis of 72 cases[J]. J Oral Pathol Med, 2021, 50(7): 723-730. doi: 10.1111/jop.13168.

[26] Cao N, Shi H, Chen C, et al. Characterization of comprehensive dynamic epigenetic changes during human primary Sjögren's syndrome progression[J]. Ann Transl Med, 2021, 9(13): 1044. doi: 10.21037/atm-21-1754.

[27] Abdel-Magid AF. The inhibitors of mucosa-associated lymphoid tissue lymphoma translocation protein 1 (MALT-1) protease as potential treatment of ABC-DLBCL and similar diseases[J]. ACS Med Chem Lett, 2024, 15(6): 763-765. doi: 10.1021/acsmedchemlett.4c00184.

[28] Du MQ. EMZL at various sites: learning from each other[J]. Blood, 2025, 145(19): 2117-2127. doi: 10.1182/blood.2024025794.

[29] Korona B, Korona D, Zhao W, et al. GPR34 activation potentially bridges lymphoepithelial lesions to genesis of salivary gland MALT lymphoma[J]. Blood, 2022, 139(14): 2186-2197. doi: 10.1182/blood.2020010495.

[30] Lin JS, Liu CJ. Mucosa-associated lymphoid tissue lymphoma at the parotid gland[J]. J Cancer Res Ther, 2024, 20(1): 467-468. doi: 10.4103/jcrt.jcrt_1909_22.

[31] Di Santo D, Bramati C, Festa BM, et al. Current evidence on diagnosis and treatment of parotid gland lymphomas: a systematic review[J]. Eur Arch Otorhinolaryngol, 2023, 280(12): 5219-5227. doi: 10.1007/s00405-023-08206-3.

[32] Mantsopoulos K, Koch M, Fauck V, et al. Primary parotid gland lymphoma: pitfalls in the use of ultrasound imaging by a great pretender[J]. Int J Oral Maxillofac Surg, 2021, 50(5): 573-578. doi: 10.1016/j.ijom.2020.08.008.

[33] Ko KWS, Bhatia KS, Ai QYH, et al. Imaging of head and neck mucosa-associated lymphoid tissue lymphoma (MALToma)[J]. Cancer Imaging, 2021, 21(1): 10. doi: 10.1186/s40644-020-00380-5.

[34] Watanabe Y, Fujii H, Yamamoto S, et al. Parotid gland MALT lymphoma with amyloid deposition, challenges in preoperative diagnosis: a case report[J]. Radiol Case Rep, 2024, 19(12): 6141-6146. doi: 10.1016/j.radcr.2024.09.083.

[35] Mayerhoefer ME, Archibald SJ, Messiou C, et al. MRI and PET/MRI in hematologic malignancies[J]. J Magn Reson Imaging, 2020, 51(5): 1325-1335. doi: 10.1002/jmri.26848.

[36] van Ginkel MS, Arends S, van der Vegt B, et al. FDG-PET/CT discriminates between patients with and without lymphomas in primary Sjögren's syndrome[J]. Rheumatology(Oxford), 2023, 62(10): 3323-3331. doi: 10.1093/rheumatology/kead071.

[37] Kawaji K, Kurata S, Matsuo K, et al. ^{18}F-FDG PET/CT imaging of IgG4-producing MALT lymphoma with multiple site involvement [J]. Asia Ocean J Nucl Med Biol, 2024, 12(1): 52-56. doi: 10.22038/AOJNMB.2023.73477.1512.

[38] 宿骞, 彭歆, 周传香, 等. 369例口腔颌面部非霍奇金淋巴瘤的临床病理特点及预后[J]. 北京大学学报(医学版), 2023, 55(1): 13-21. doi: 10.19723/j.issn.1671-167X.2023.01.003.
Su Q, Peng X, Zhou CX, et al. Clinicopathological characteristics and prognosis of non-Hodgkin lymphoma in oral and maxillofacial regions: an analysis of 369 cases[J]. J Peking Univ Health Sci, 2023, 55(1): 13-21. doi: 10.19723/j.issn.1671-167X.2023.01.003.

[39] Kaur R, Shetty D, Bagal BP, et al. Extranodal MALT lymphoma in the oral cavity: a series of three cases with review of literature[J]. Head Neck Pathol, 2022, 16(4): 1242-1250. doi: 10.1007/s12105-022-01461-6.

[40] 池彦廷, 张延平, 张秋露, 等. 唾液腺干燥综合征继发黏膜相关淋巴组织淋巴瘤的临床病理分析[J]. 北京大学学报(医学版), 2021, 53(1): 40-45. doi: 10.19723/j.issn.1671-167X.2021.01.007.
Chi YT, Zhang YP, Zhang QL, et al. Clinicopathological analysis of mucosa associated lymphoid tissue lymphoma secondary to Sjögren's syndrome in salivary gland[J]. J Peking Univ Health Sci, 2021, 53(1): 40-45. doi: 10.19723/j.issn.1671-167X.2021.01.007.

[41] Singh R, Shaik S, Negi BS, et al. Non-Hodgkin's lymphoma: a review[J]. J Family Med Prim Care, 2020, 9(4): 1834-1840. doi: 10.4103/jfmpc.jfmpc_1037_19.

[42] Chen LY, Tsai MH, Tsai LT, et al. Primary Sjögren's syndrome initially presenting as submandibular mucosa-associated lymphoid tissue lymphoma: a case report[J]. Oncol Lett, 2016, 11(2): 921-924. doi: 10.3892/ol.2015.3980.

[43] Abe S, Yokomizo N, Kobayashi Y, et al. Confirmation of immunoglobulin heavy chain rearrangement by polymerase chain reaction using surgically obtained, paraffin-embedded samples to diagnose primary palate mucosa-associated lymphoid tissue lymphoma: a case study[J]. Int J Surg Case Rep, 2015, 10: 129-133. doi: 10.1016/j.ijscr.2015.03.046.

[44] Ahmed F, Raslan O, Muzaffar R, et al. Sjögren syndrome complicated by mucosa-associated lymphoid tissue lymphoma and lymphocytic interstitial pneumonia[J]. Front Oncol, 2015, 5: 179. doi: 10.3389/fonc.2015.00179.

[45] Yonal-Hindilerden I, Hindilerden F, Arslan S, et al. Primary B-cell mucosa-associated lymphoid tissue lymphoma of the hard palate and parotid gland: report of one case and review of the literature[J]. J Clin Med Res, 2016, 8(11): 824-830. doi: 10.14740/jocmr2733w.

[46] Aydın S, Demir MG, Barışık NÖ. Extranodal marginal zone lymphoma of the parotid gland[J]. J Maxillofac Oral Surg, 2016, 15 (Suppl 2): 346-350. doi: 10.1007/s12663-016-0882-x.

[47] Iftikhar H, Siddiqui MI, Minhas K. MALT lymphoma of the base of the tongue: a rare case entity[J]. BMJ Case Rep, 2016, 2016: bcr2015213830. doi: 10.1136/bcr-2015-213830.

[48] Chadha J, Teng MS, Teruya-Feldstein J, et al. Radiation for MALT of the submandibular gland[J]. Case Rep Hematol, 2017, 2017: 8397621. doi: 10.1155/2017/8397621.

[49] Titsinides S, Nikitakis N, Piperi E, et al. MALT lymphoma of minor salivary glands in a sjögren's syndrome patient: a case re-

port and review of literature[J]. J Oral Maxillofac Res, 2017, 8(1): e5. doi: 10.5037/jomr.2017.8105.

[50] 王开, 康非吾. 涎腺黏膜相关淋巴组织型淋巴瘤报告1例及文献系统分析[J]. 口腔医学, 2018, 38(12): 1137-1140. doi: 10.13591/j.cnki.kqyx.2018.12.018.
Wang K, Kang FW. Salivary glands mucosa-associated lymphoid tissue lymphoma in head and neck: a case report and systematic literature review[J]. Stomatology, 2018, 38(12): 1137-1140. doi: 10.13591/j.cnki.kqyx.2018.12.018.

[51] Hwang JH, Kim DW, Kim KS, et al. Mucosa-associated lymphoid tissue lymphoma of the accessory parotid gland presenting as a simple cheek mass: a case report[J]. Medicine(Baltimore), 2019, 98(36): e17042. doi: 10.1097/MD.0000000000017042.

[52] Iversen L, Eriksen PRG, Andreasen S, et al. Lymphoma of the sublingual gland: clinical, morphological, histopathological, and genetic characterization[J]. Front Surg, 2020, 7: 581105. doi: 10.3389/fsurg.2020.581105.

[53] Baik J, Baek HJ, Ryu KH, et al. MALT lymphoma of the tongue in a patient with sjögren's syndrome: a case report and literature review[J]. Diagnostics(Basel), 2021, 11(9): 1715. doi: 10.3390/diagnostics11091715.

[54] Povlow MR, Streiff M, Madireddi S, et al. A primary parotid mucosa-associated lymphoid tissue non-Hodgkin lymphoma in a patient with sjogren syndrome[J]. Cureus, 2021, 13(6): e15679. doi: 10.7759/cureus.15679.

[55] 贺帅, 居红格. 下唇黏膜相关淋巴组织淋巴瘤1例[J]. 中华老年口腔医学杂志, 2021, 19(1): 15-16. doi: 10.19749/j.cn.cjgd.1672-2973.2021.01.004.
He S, Ju HG. Lower lip mucosa-associated lymphoid tissue lymphoma one case[J]. Chin J Geriatr Dent, 2021, 19(1): 15-16. doi: 10.19749/j.cn.cjgd.1672-2973.2021.01.004.

[56] Ono S, Goto M, Miyabe S, et al. MALT lymphoma of the sublingual gland: a case report with current overview of diagnostic and therapeutic strategies[J]. Clin Case Rep, 2022, 10(10): e6293. doi: 10.1002/ccr3.6293.

[57] Aleksiejūnaitė M, Talijūnas A, Zaleckas L, et al. Mucosa-associated lymphoid tissue lymphoma of the sublingual salivary gland: a case report[J]. Cureus, 2023, 15(4): e38179. doi: 10.7759/cureus.38179.

[58] 盛津津, 马燕凌, 李黎. 腮腺原发黏膜相关淋巴组织淋巴瘤合并干燥综合征1例并文献复习[J]. 癌症进展, 2023, 21(9): 1041-1044. doi: 10.11877/j.issn.1672-1535.2023.21.09.29.
Sheng JJ, Ma YL, Li L. Primary mucosa-associated lymphoid tissue lymphoma of parotid gland complicated with Sjogren's syndrome: a case report and literature review[J]. Oncol Prog, 2023, 21(9): 1041-1044. doi: 10.11877/j.issn.1672-1535.2023.21.09.29.

[59] Jayabalan J, Albert D, Nathanael I, et al. A rare case of low-grade B-cell non-Hodgkin's lymphoma of the lower lip mimicking a mucocele[J]. Cureus, 2024, 16(3): e57154. doi: 10.7759/cureus.57154.

[60] Muntean D, Dudea S, Lenghel M, et al. Mucosa-associated lymphoid tissue lymphoma of the parotid gland - a case report[J]. Med Ultrason, 2021, 23(3): 364-366. doi: 10.11152/mu-2957.

[61] Hrizat AS, Gong J, Gargano SM. Institutional experience of lymphoproliferative disorders with initial diagnosis made *via* fine needle aspiration at otolaryngology clinic[J]. Acta Med Acad, 2024, 53(3): 274-285. doi: 10.5644/ama2006-124.456.

[62] Baer AN, Grader-Beck T, Antiochos B, et al. Ultrasound-guided biopsy of suspected salivary gland lymphoma in sjögren's syndrome[J]. Arthritis Care Res(Hoboken), 2021, 73(6): 849-855. doi: 10.1002/acr.24203.

[63] Jering M, Mayer M, Thölken R, et al. Diagnostic accuracy and post-procedural complications associated with ultrasound-guided core needle biopsy in the preoperative evaluation of parotid tumors [J]. Head Neck Pathol, 2022, 16(3): 651-656. doi: 10.1007/s12105-021-01401-w.

[64] Chatzis L, Goules AV, Pezoulas V, et al. A biomarker for lymphoma development in Sjogren's syndrome: salivary gland focus score[J]. J Autoimmun, 2021, 121: 102648. doi: 10.1016/j.jaut.2021.102648.

[65] Broeren MGA, Wang JJ, Balzaretti G, et al. Proteogenomic analysis of the autoreactive B cell repertoire in blood and tissues of patients with Sjögren's syndrome[J]. Ann Rheum Dis, 2022, 81(5): 644-652. doi: 10.1136/annrheumdis-2021-221604.

[66] Chatzis LG, Stergiou IE, Goules AV, et al. Clinical picture, outcome and predictive factors of lymphoma in primary Sjögren's syndrome: results from a harmonized dataset (1981-2021)[J]. Rheumatology(Oxford), 2022, 61(9): 3576-3585. doi: 10.1093/rheumatology/keab939.

[67] Wagner VP, Rodrigues-Fernandes CI, Carvalho MVR, et al. Mantle cell lymphoma, malt lymphoma, small lymphocytic lymphoma, and follicular lymphoma of the oral cavity: an update[J]. J Oral Pathol Med, 2021, 50(6): 622-630. doi: 10.1111/jop.13214.

[68] Zhang YY, Mao MH, Feng ZE, et al. Investigation of the treatment modality in primary lymphoma of the salivary glands[J]. J Stomatol Oral Maxillofac Surg, 2021, 122(3): 248-255. doi: 10.1016/j.jormas.2020.07.006.

[69] Al-Khafaf AE, Al-Shahrestani F, Baysal Y, et al. Lymphomas of the salivary glands: a systematic review[J]. Acta Otolaryngol, 2023, 143(7): 610-616. doi: 10.1080/00016489.2023.2226689.

[70] 石远凯, 秦燕, 陈海珠, 等. 中国淋巴瘤治疗指南(2023年版)[J]. 中国肿瘤临床与康复, 2023, 30(1): 2-39. doi: 10.13455/j.cnki.cjcor.113494-20230118-0032.
Shi YK, Qin Yan ,Chen HZ, et al. Clinical practice guideline for lymphoma in China(2023 version)[J]. Chin J Clin Oncol Rehabil, 2023, 30(1): 2-39. doi: 10.13455/j.cnki.cjcor.113494-20230118-0032.

[71] Yao M, Liao SL, Lin CW, et al. First-line antibiotic treatment in patients with localized extragastric mucosa-associated lymphoid tissue lymphoma[J]. EJHaem, 2022, 4(1): 55-66. doi: 10.1002/jha2.608.

[72] Zhang T, Wu Y, Ju H, et al. Extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue in the oromaxillofacial head and neck region: a retrospective analysis of 105 patients [J]. Cancer Med, 2020, 9(1): 194-203. doi: 10.1002/cam4.2681.

[73] Wang H, Wan X, Zhang Y, et al. Advances in the treatment of re-

lapsed/refractory marginal zone lymphoma[J]. Front Oncol, 2024, 14: 1327309. doi: 10.3389/fonc.2024.1327309.

[74] Zelenetz AD, Gordon LI, Chang JE, et al. NCCN guidelines® insights: B-cell lymphomas, version 5.2021[J]. J Natl Compr Canc Netw, 2021, 19(11): 1218-1230. doi: 10.6004/jnccn.2021.0054.

[75] Xie W, Medeiros LJ, Li S, et al. PD-1/PD-L1 pathway and its blockade in patients with classic Hodgkin lymphoma and non-Hodgkin large-cell lymphomas[J]. Curr Hematol Malig Rep, 2020, 15(4): 372-381. doi: 10.1007/s11899-020-00589-y.

[76] Kiesewetter B, Raderer M. How can we assess and measure prognosis for MALT lymphoma? A review of current findings and strategies[J]. Expert Rev Hematol, 2021, 14(4): 391-399. doi: 10.1080/17474086.2021.1909468.

[77] Zucca E, Arcaini L, Buske C, et al. Marginal zone lymphomas: ESMO clinical practice guidelines for diagnosis, treatment and follow-up[J]. Ann Oncol, 2020, 31(1): 17-29. doi: 10.1016/j.annonc.2019.10.010.

[78] Jeong JU, Lee HC, Song JH, et al. Long-term clinical efficacy of radiotherapy for patients with stage I-II gastric extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue: a retrospective multi-institutional study[J]. Cancer Res Treat, 2025, 57(2): 570-579. doi: 10.4143/crt.2024.651.

[79] Matsuo Y, Monden Y, Sasaki K, et al. Treatment outcomes in patients with conjunctival mucosa-associated lymphoid tissue (MALT) lymphoma[J]. Clin Ophthalmol, 2024, 18: 1999-2007. doi: 10.2147/OPTH.S463653.

[80] Parry EM, Roulland S, Okosun J. DLBCL arising from indolent lymphomas: How are they different?[J]. Semin Hematol, 2023, 60(5): 277-284. doi: 10.1053/j.seminhematol.2023.11.002.

[81] Kim HD, Cho H, Jeong H, et al. A prognostic index for extranodal marginal-zone lymphoma based on the mucosa-associated lymphoid tissue International prognostic index and serum β2-microglobulin levels[J]. Br J Haematol, 2021, 193(2): 307-315. doi: 10.1111/bjh.17222.

[82] Frustaci AM, Deodato M, Zamprogna G, et al. Next generation BTK inhibitors in CLL: evolving challenges and new opportunities [J]. Cancers(Basel), 2023, 15(5): 1504. doi: 10.3390/cancers15051504.

[83] Zhang J, Hu Y, Yang J, et al. Non-viral, specifically targeted CAR-T cells achieve high safety and efficacy in B-NHL[J]. Nature, 2022, 609(7926): 369-374. doi: 10.1038/s41586-022-05140-y.

（编辑　罗燕鸿）

官网