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Original research

The reported rates of transformation of oral lichen planus

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ABSTRACT

Objectives: Our aim was to investigate the source, variability and robustness of oral lichen planus (OLP) malignant transformation rates quoted in the literature.
Materials and methods: Online indexed scientific literature reporting the association of OLP with malignant transformation was searched yielding the largest analysis of such episodes to date (65 papers, accumulating 24097 cases of OLP, with 386 instances of subsequent malignancies) resulting in a raw integrated transformation rate of 1.60%.
Results: The data spans 88 years but is poorly standardised. A "yearly rate of malignant transformation" was estimated in papers where either the average ($n = 32$) or the range of follow up times ($n = 18$) was reported. These ranged from 0% to 2.03% transformations/year (average 0.43%, median 0.25%/year). However, these rates appear to overestimate the malignant transformation frequencies of oral lichen planus when considering the overall incidence of oral cancer in the UK.
Conclusion: While there was evidence of an association of OLP with risk of subsequent malignant transformation, a number of factors resulting from the lack of standardisation in the reports obscure the elucidation of the real risks associated with the disorder. We suggest the use of structured, standardised reporting to facilitate parsing and summarising future data.
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1. Introduction

Oral lichen planus (OLP) is a potentially malignant disorder (PMD) [1], with a variable quoted malignant transformation risk. Numerous factors have been associated with oral PMDs development [2,3] but there is a lack of precise clinical, histological and molecular predictors of malignant change for OLP. It seems important therefore to clarify the evidence supporting claims of malignant potential in OLP. For effective clinical management of the condition, it would be useful to estimate, probabilistically, the likelihood of malignant change over time, but unfortunately this remains unclear. We analysed the reported OLP transformation rates, integrated both prospectively and retrospectively and according to diagnostic criteria. While the quality of the data published is not suitable to perform a systematic review to current epidemiological standards, it nevertheless reveals a number of issues related to the variability and possible perception of the transformation risk. We propose that structured follow up and reporting strategies might help elucidate the real risks associated with malignant transformation in OLP.

2. Materials and methods

A search of the scientific literature accessible via online databases (PubMed, Web of Science and ScienceDirect) was performed on titles, abstracts and keywords for "oral lichen planus", plus the expressions "cancer", "malignant transformation", "malignancy", "pre-malignant" and "pre-cancerous". In addition, compound logical expressions with Boolean operators were performed on the same fields on the Web of Science: (oral AND lichen AND planus AND transformation AND rate AND (cancer OR malignant OR premalignant OR precancerous)). Papers were selected when their abstracts included information regarding malignant transformation episodes or association with oral neoplasms. After this initial selection, papers were included in the analysis when they provided the number of patients recruited and those subsequently diagnosed with oral cancer. Duration of follow up for the patients, rate of transformation, the criteria used for the diagnosis (histological or solely clinical) and whether the study

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Table 1
Selected studies on oral lichen planus. The table shows all sixty-five papers selected for the study. Thirty-two papers provided follow up data, in 18 papers an estimation was made based on the average of the minimum and maximum quoted follow up time, while 15 papers provided no follow up information. The "yearly rate of malignant transformation" was computed as the ratio of the percentage of cases that transformed and the average reported (or estimated) follow up time. The 'type' column indicates the criteria used in the original papers: OLP stands for oral lichen planus, excluding lichenoid reactions (OLR), while OLP-NOS (for '*not otherwise specified*') indicates no explicit distinction.

Ref.	Authors (year)	Origin	Study	OLP type	Confirmed histology	Cases		Rate	Follow up		Mean follow up (yrs)		Yearly rate of transformation
						OLP	Carcinoma		Minimum	Maximum	Estimated	Reported	
[4]	Williger et al. (1924)	Germany	Unknown	Unknown	Unknown	20	2	10.00					
[5]	Montgomery and Culver (1929)	UK	Unknown	Unknown	Unknown	17	1	5.88	1.00	9.00	5.00		1.176
[6]	Schuermann (1939)	Germany	Unknown	Unknown	Unknown	310	2	0.65					
[7]	Dechaume et al. (1957)	France	Unknown	Unknown	Unknown	50	5	10.00					
[8]	Sugár and Bánóczy (1959)	Hungary	Unknown	Unknown	Unknown	36	1	2.78	11.00	11.00	11.00		0.253
[9]	Warin (1960)	UK	Retro	OLP NOS	Some	53	4	7.55	1.00	12.00	6.50		1.161
[10]	Altman and Perry (1961)	USA	Unknown	Unknown	Unknown	128	1	0.78	6.00	10.00	8.00		0.098
[11]	Grinspan et al. (1966)	France	Unknown	Unknown	Unknown	114	8	7.02					
[12]	Rhode (1966)	Germany	Unknown	Unknown	Unknown	207	6	2.90					
[13]	von Janner et al. (1967)	Germany	Unknown	Unknown	Unknown	585	9	1.54	1.00	24.00	12.50		0.123
[14]	Andreasen (1968)	Denmark	Prosp	OLP NOS	84%	115	0	0.00	0.08	10.00		2.50	0.000
[15]	Cawson (1968)	UK	Retro	OLP NOS	Unknown	138	1	0.72					
[16]	von Abramova (1968)	Russia	Unknown	OLP NOS	Unknown	436	5	1.15	5.00	8.00	6.50		0.176
[17]	Shklar (1972)	USA	Retro	OLP NOS	Unknown	600	3	0.50	1.00	15.00	8.00		0.063
[18]	Fulling (1973)	Denmark	Retro	OLP NOS	Histology	225	1	0.44	0.08	12.00		3.60	0.122
[19]	Kövesi and Bánóczy (1973)	Hungary	Retro	OLP NOS	Some	274	1	0.36	1.00	10.00	5.50		0.066
[20]	Silverman and Griffith (1974)	USA	Retro	OLP NOS	Histology	200	5	2.50					
[21]	Holmstrup and Pindborg (1979)	Denmark	Prosp	OLP NOS	Some	740	3	0.41	0.40	6.50	3.45		0.118
[22]	Vaskovskaya and Abramov (1981)	Russia	Unknown	Unknown	Unknown	725	29	4.00					
[23]	Silverman et al. (1985)	USA	Prosp	OLP NOS	Histology	570	7	1.23	0.50	10.00		5.60	0.220
[24]	Murti el al (1986)	India	Prosp	OLP NOS	Some	702	3	0.43	1.00	10.00		5.10	0.084
[25]	Holmstrup et al. (1988)	Denmark	Prosp	OLP	Histology	611	9	1.47	1.00	26.00		7.50	0.196
[26]	Salem (1989)	Saudi Arabia	Retro	OLP NOS	Histology	72	4	5.56				3.20	1.738
[27]	Vincent et al. (1990)	USA	Retro	OLP	16%	100	0	0.00				9.10	0.000
[28]	Silverman et al. (1991)	USA	Prosp	OLP NOS	Histology	214	5	2.34				7.50	0.312
[29]	Carbone et al. (1992)	Italy	Retro	OLP NOS	Histology	140	10	7.14				4.00	1.786
[30]	Voute et al. (1992)	Netherlands	Retro	OLP NOS	Histology	113	3	2.65				7.80	0.340
[31]	Barnard et al. (1993)	UK	Retro	OLP NOS	Histology	241	9	3.73	0.50	17.00	8.75		0.427
[32]	Brown et al. (1993)	USA	Retro	OLP NOS	Clinical	193	0	0.00	2.00	8.00		8.00	0.000
[33]	Moncarz et al. (1993)	Israel	Retro	OLP NOS	Unknown	280	6	2.14					
[34]	Duffey et al. (1996)	USA	Retro	OLP NOS	Transformed	955	5	0.52				4.50	0.116
[35]	Gorsky et al. (1996)	Israel	Retro	OLP NOS	Histology	157	2	1.27	0.25	15.00		1.50	0.849
[36]	Vescovi and Genari (1996)	Italy	Unknown	Unknown	Unknown	71	3	4.23				5.00	0.846
[37]	Al-Dosari et al. (1997)	Saudi Arabia	Retro	OLP NOS	Some	150	0	0	1.00	12.00	6.50		0.000
[38]	Markopoulos et al. (1997)	Greece	Retro	OLP	Histology	326	4	1.23	0.50	10.00		4.80	0.256
[39]	Silverman and Bahl (1997)	USA	Retro	OLP NOS	80%	95	3	3.16	1.00	20.00		6.10	0.518
[40]	Lo Muzio et al. (1998)	Italy	Retro	OLP NOS	Histology	263	10	3.8	1.00	10.00		5.70	0.667
[41]	Garcia-Pola et al. (1999)	Spain	Prosp	OLP NOS	Histology	210	4	1.9	1.00	10.00	5.50		0.345
[42]	Rajentheran et al. (1999)	UK	Retro	OLP	Histology	832	7	0.84				6.00	0.140
[43]	Chainani-Wu et al. (2001)	USA	Retro	OLP NOS	75%	229	4	1.75	1.00	4.00	2.50		0.700
[44]	Cowan et al. (2001)	UK	Retro	OLP + OLR	Histology	383	0	0	1.00	20.00	10.50		0.000
[45]	Eisen (2002)	USA	Retro	OLP	Histology	723	6	0.83	0.50	8.00		4.50	0.184
[46]	Yaacob et al. (2002)	Malaysia	Retro	OLP + OLR	Histology	19	1	5.26				3.60	1.461
[47]	Rode and Kogoj-Rode (2002)	Slovenia	Retro	OLP NOS	Histology	55	0	0.00				25.00	0.000

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