

· 临床研究 ·

老年单侧甲状腺叶切除术后甲状腺功能恢复的影响因素

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【摘要】目的 探讨老年单侧甲状腺叶切除术患者甲状腺功能恢复的影响因素。**方法** 选择2020年6月至2022年6月湖北文理学院附属医院襄阳市中心医院收治的346例单侧甲状腺叶切除术患者为研究对象。根据年龄将患者分为中青年组(18~<60岁, $n=113$)与老年组(≥ 60 岁, $n=233$),比较不同年龄段患者术后甲状腺功能恢复情况,统计甲状腺功能减退发生率。将老年组中出现甲状腺功能减退者分为甲减组($n=65$),甲状腺功能正常者分为对照组($n=168$)。采用SPSS 19.0统计软件进行数据分析。根据数据类型,分别采用 t 检验、方差分析或 χ^2 检验进行组间比较。采用二元logistic回归模型分析老年单侧甲状腺叶切除术患者术后甲状腺功能的影响因素。**结果** 中青年组患者术后2个月,游离三碘甲状腺原氨酸(FT3)水平较术前降低,促甲状腺激素(TSH)水平较术前上升,差异均有统计学意义($P<0.05$),两指标均在术后6个月恢复至术前水平;术前及术后各时间段游离甲状腺素(FT4)水平无明显改变,差异无统计学意义($P>0.05$)。老年组患者术后2个月、6个月及1年时,FT3及FT4水平均低于术前水平,TSH水平均高于术前水平,差异均有统计学意义($P<0.05$)。老年组患者术后各时间段FT4水平均低于中青年组,术前及术后各时间段FSH水平均高于中青年组,差异有统计学意义($P<0.05$)。老年组术后1年甲状腺功能减退发生率高于中青年组(27.90%和8.85%),差异有统计学意义($\chi^2=4.225, P<0.05$)。二元logistic回归分析提示,年龄($OR=2.199, 95\%CI 1.099\sim 4.401$)、体质量指数($OR=1.793, 95\%CI 1.275\sim 2.522$)、术前TSH($OR=2.404, 95\%CI 1.419\sim 4.072$)、甲状腺过氧化物酶抗体(TPOAb)阳性($OR=1.988, 95\%CI 1.081\sim 3.657$)及血清白细胞介素-6(IL-6)水平($OR=1.624, 95\%CI 1.232\sim 2.141$)是影响术后并发甲状腺功能减退的相关因素。**结论** 老年单侧甲状腺叶切除患者术后甲状腺功能恢复情况差于中青年,更易发生甲状腺功能减退,术前TSH升高、TPOAb阳性以及年龄、体质量指数、血清IL-6水平是影响老年单侧甲状腺叶切除术后甲状腺功能减退的相关因素。

【关键词】 老年人;单侧甲状腺叶切除术;甲状腺功能减退症

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Influencing factors of thyroid function recovery after unilateral thyroid lobectomy in the elderly

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【Abstract】 Objective To explore the influencing factors of thyroid function recovery in the elderly patients undergoing unilateral thyroid lobectomy. **Methods** A total of 346 patients receiving unilateral thyroid lobectomy in Xiangyang Central Hospital, Affiliated Hospital of Hubei University of Arts and Sciences from June 2020 to June 2022 were enrolled as the study subjects, and they were divided into young and middle-aged group (18-<60 years, $n=113$) and elderly group (≥ 60 years, $n=233$). The postoperative thyroid function recovery was compared between age groups, and the incidence rate of hypothyroidism was counted. The patients with hypothyroidism in the elderly group were included in the hypothyroidism group ($n=65$) and those with normal thyroid function were selected as the control group ($n=168$). SPSS 19.0 was used for data analysis. According to the data type, t test, analysis of variance or Chi -square test was used for comparison between groups. Binary logistic regression model was used to analyze the influencing factors of the postoperative thyroid function in the elderly patients undergoing unilateral thyroid lobectomy. **Results** At two months after surgery, the level of free triiodothyronine (FT3) in the young and middle-aged group was lower than that before surgery, and the level of thyroid stimulating hormone (TSH) was higher than that before surgery, the differences being statistically significant ($P<0.05$). The two indicators returned to the preoperative levels at six months after surgery. There was no significant change in the level of free thyroxine

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(FT4) at different time points after surgery as compared before surgery with no statistically significant difference ($P>0.05$). In the elderly group, at two months, six months, and one year after surgery, the levels of FT3 and FT4 were lower, and the TSH level was higher than those before surgery, the differences being statistically significant ($P<0.05$). The level of FT4 in the elderly group at each time point after surgery was lower than that in the young and middle-aged group, and the level of FSH before surgery and at each time point after surgery was higher than that in the young and middle-aged group, the differences being statistically significant ($P<0.05$). The incidence of hypothyroidism at one year after surgery in the elderly group (27.90%) was higher than that in the young and middle-aged group (8.85%) ($\chi^2=4.225, P<0.05$). Binary logistic regression analysis suggested that age ($OR=2.199, 95\%CI 1.099-4.401$), body mass index ($OR=1.793, 95\%CI 1.275-2.522$), preoperative TSH ($OR=2.404, 95\%CI 1.419-4.072$), positive thyroid peroxidase antibody (TPOAb) ($OR=1.988, 95\%CI 1.081-3.657$) and serum interleukin-6 (IL-6) level ($OR=1.624, 95\%CI 1.232-2.141$) were factors affecting postoperative hypothyroidism. **Conclusion** The elderly patients have a poorer thyroid function recovery after unilateral thyroid lobectomy than the young and middle-aged patients and are more prone to hypothyroidism. Preoperative TSH elevation, positive TPOAb, age, body mass index and serum IL-6 level are factors affecting hypothyroidism in the elderly after unilateral thyroid lobectomy.

【Key words】 aged; unilateral thyroid lobectomy; hypothyroidism

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单侧甲状腺叶切除术是公认的治疗单侧甲状腺良性结节的最佳手术方式,但其依旧不能避免术后甲状腺功能减退症(简称甲减)问题。有研究数据显示,单侧甲状腺叶切除术后甲减发生率为5.0%~41.9%^[1]。老年人是甲状腺结节的高发人群,老年患者单侧甲状腺叶切除术后甲减备受关注,因为甲减不仅会引起皮肤干燥、脱发、意识不清等临床症状,还会促进动脉粥样硬化进程,增加各类心血管疾病患病风险,危及老年患者生命健康^[2,3]。研究老年单侧甲状腺叶切除术后甲状腺功能恢复特点及甲减相关危险因素,在提高老年患者手术安全性中具有重要意义。

1 对象与方法

1.1 研究对象

选择2020年6月至2022年6月湖北文理学院附属医院襄阳市中心医院收治的346例行单侧甲状腺叶切除术患者为研究对象。根据年龄将患者分为中青年组(18~<60岁, $n=113$)与老年组(≥ 60 岁, $n=233$)。随访1年,根据患者甲状腺功能恢复情况,将老年组患者分为甲减组($n=65$)与对照组($n=168$)。甲减组患者出现亚临床甲状腺功能减退[促甲状腺激素(thyroid stimulating hormone, TSH)升高,游离甲状腺素(free thyroxine, FT4)正常]或明显甲状腺功能减退(TSH升高, FT4减少)。纳入标准:首次接受甲状腺相关手术治疗;行单侧甲状腺叶切除术;术后病理证实为甲状腺良性肿瘤;术前甲状腺激素5项均在正常范围内。排除标准:病理检查提示甲状腺恶性肿瘤;既往有甲状腺手术史;术前或术后接受甲状腺激

素抑制剂或替代治疗;合并血液系统疾病;妊娠或哺乳期女性;服用降脂药物。本研究经医院医学伦理委员会批准(伦理批号:2019443),参与者均知情同意且签署知情同意书。

1.2 方法

(1)比较不同年龄组患者术后甲状腺功能恢复情况。甲状腺功能及甲状腺自身抗体水平使用DXC600全自动生化分析仪及配套试剂(购自美国贝克曼公司)检测。其中TSH正常范围:0.45~4.50 mIU/L, FT4正常范围:12.0~22.0 pmol/L。游离三碘甲状腺原氨酸(free triiodothyronine, FT3)正常范围:2.0~6.6 pmol/L。(2)比较甲减组与对照组的临床资料,包括年龄、性别、体质量指数(body mass index, BMI)、甲状腺质量、术前FT3、FT4、TSH、甲状腺过氧化物酶抗体(thyroid peroxidase antibody, TPOAb)、促甲状腺激素受体抗体(thyrotropin receptor antibody, TRAb)、白蛋白(albumin, ALB)、白细胞介素-6(interleukin-6, IL-6)、总胆固醇(total cholesterol, TC)、甘油三酯(triglyceride, TG)、高密度脂蛋白胆固醇(high-density lipoprotein cholesterol, HDL-C)、低密度脂蛋白胆固醇(low-density lipoprotein cholesterol, LDL-C)、尿素氮(urea nitrogen, BUN)、血红蛋白(hemoglobin, Hg)及淋巴细胞比率(lymphocyte ratio, LY)水平。

1.3 统计学处理

采用SPSS 19.0统计软件进行数据分析。计量资料以均数 \pm 标准差($\bar{x}\pm s$)表示,两组间比较采用 t 检验;组内多时间点行重复测量方差分析,检验有意义者,两两比较行LSD- t 检验。计数资料以例数

(百分率)表示,组间比较采用 χ^2 检验。采用二元logistic回归模型分析老年单侧甲状腺叶切除患者术后并发甲减的影响因素。 $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 中青年组与老年组患者手术前后甲状腺功能比较

中青年组患者术后2个月,FT3水平较术前降低,TSH水平较术前上升,差异均有统计学意义($P < 0.05$);但两指标均在术后6个月恢复至术前水平,差异无统计学意义($P > 0.05$)。中青年组患者术前及术后各时间段FT4水平无明显改变,差异无统计学意义($P > 0.05$)。老年组患者术后2个月、6个月及1年时,FT3及FT4水平低于术前水平,TSH水平均高于术前水平,差异均有统计学意义($P < 0.05$)。此外,老年组患者术后各时间段FT4水平均低于中青年组,术前及术后各时间段FSH水平均高于中青年组,差异有统计学意义($P < 0.05$)。不同年龄段组患者手术前后甲状腺功能情况详见表1。老年组术后1年甲减发生率高于中青年组[27.90%(65/168)和(8.85%(10/65)],差异有统计学意义($\chi^2 = 4.225, P < 0.05$)。

表1 两组患者手术前后甲状腺功能比较

Table 1 Comparison of thyroid function before and after surgery between two groups ($\bar{x} \pm s$)

Group	n	FT3 (pmol/L)	FT4 (pmol/L)	TSH (mIU/L)
Young and middle-aged	113			
Before surgery		4.85±0.65	16.89±2.69	2.37±0.65
2 months after surgery		4.21±0.62*	16.53±3.24	2.66±0.84*
6 months after surgery		4.75±0.87	16.94±2.87	2.33±0.79
1 year after surgery		4.83±0.82	16.58±2.94	2.29±0.69
Elderly	233			
Before surgery		4.78±0.81	16.58±3.07	2.61±0.52 [#]
2 months after surgery		4.26±0.69*	14.36±2.94* [#]	3.43±0.79* [#]
6 months after surgery		4.31±0.73*	15.37±3.13* [#]	3.21±0.88* [#]
1 year after surgery		4.53±0.75*	16.11±2.84* [#]	2.86±0.68* [#]

FT3: free triiodothyronine; FT4: free thyroxine; TSH: thyroid stimulating hormone. Compared with the same group before surgery, * $P < 0.05$; compared with the young and middle-aged group at the same time point, [#] $P < 0.05$.

2.2 影响老年单侧甲状腺叶切除术后甲减发生的单因素分析

老年单侧甲状腺叶切除术后甲减组患者与对照组患者年龄、BMI、合并糖尿病情况、TSH、TPOAb、ALB、IL-6以及TC水平比较,差异有统计学意义($P < 0.05$;表2)。

表2 患者术后甲减发生的单因素分析

Table 2 Univariate analysis of occurrence of postoperative hypothyroidism

Item	Hypothyroidism group (n=65)	Control group (n=168)	χ^2/t	P value
Age[n(%)]			6.790	0.009
60-<80 years	24(36.92)	94(55.95)		
≥80 years	41(63.08)	74(44.05)		
Gender[n(%)]			2.601	0.107
Male	20(30.77)	71(42.26)		
Female	45(69.23)	97(57.74)		
BMI[n(%)]			15.161	<0.001
<18.5 kg/m ²	11(16.92)	22(13.09)		
18.5-<24.0 kg/m ²	28(43.08)	116(69.05)		
≥24.0 kg/m ²	26(40.00)	30(17.86)		
Underlying disease [n(%)]				
Diabetes mellitus	24(36.92)	35(20.83)	6.416	0.011
Hypertension	13(20.00)	30(17.86)	0.143	0.705
Hyperlipidemia	10(15.38)	22(13.10)	0.207	0.649
Pathological type[n(%)]			3.753	0.153
Nodular goiter	52(80.00)	135(80.36)		
Thyroid adenoma	6(9.23)	25(14.88)		
Others	7(10.77)	8(4.76)		
Resected thyroid mass (g, $\bar{x} \pm s$)	18.85±2.58	18.25±3.11	1.382	0.168
FT3(pmol/L, $\bar{x} \pm s$)	4.31±0.85	4.46±0.91	1.149	0.252
FT4(pmol/L, $\bar{x} \pm s$)	14.31±3.25	14.40±3.32	0.187	0.852
TSH(mIU/L, $\bar{x} \pm s$)	3.43±0.81	2.81±0.49	7.120	<0.001
Positive TPOAb [n(%)]	20(30.77)	19(11.31)	12.735	<0.001
Positive TRAb[n(%)]	11(16.92)	20(11.90)	1.023	0.312
ALB(g/L, $\bar{x} \pm s$)	36.58±8.59	39.45±7.68	2.474	0.014
IL-6(ng/L, $\bar{x} \pm s$)	0.45±0.11	0.38±0.09	4.994	<0.001
TC(mmol/L, $\bar{x} \pm s$)	4.55±1.32	4.12±1.25	2.318	0.021
TG(mmol/L, $\bar{x} \pm s$)	1.63±0.35	1.65±0.41	0.347	0.729
HDL-C(mmol/L, $\bar{x} \pm s$)	1.16±0.32	1.17±0.36	0.196	0.845
LDL-C(mmol/L, $\bar{x} \pm s$)	2.93±0.68	2.84±0.75	0.843	0.400
BUN(mmol/L, $\bar{x} \pm s$)	5.39±1.15	5.41±1.33	0.107	0.915
Hg(g/L, $\bar{x} \pm s$)	131.85±28.58	133.02±30.17	0.269	0.788
LY(% , $\bar{x} \pm s$)	28.85±4.69	29.34±4.92	0.691	0.491

BMI: body mass index; FT3: free triiodothyronine; FT4: free thyroxine; TSH: thyroid stimulating hormone; TPOAb: thyroid peroxidase antibody; TRAb: thyrotrophin receptor antibody; ALB: albumin; IL-6: interleukin-6; TC: total cholesterol; TG: triglyceride; HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol; BUN: urea nitrogen; Hg: hemoglobin; LY: lymphocyte ratio.

2.3 二元logistic回归分析老年单侧甲状腺叶切除患者术后甲减发生的影响因素

将老年单侧甲状腺叶切除术后是否并发甲减作为因变量,将单因素分析有意义的指标作为自变量,二元logistic回归分析提示,年龄、BMI、术前TSH、TPOAb阳性及血清IL-6水平是患者术后并发甲减的影响因素($P < 0.05$;表3)。

表3 二元logistic回归分析患者术后甲减发生的影响因素

Table 3 Binary logistic regression analysis of influencing factors of postoperative hypothyroidism

Factor	β	SE	Wald χ^2	OR	P value	95%CI
Age	0.788	0.354	4.955	2.199	0.027	1.099-4.401
BMI	0.584	0.174	11.265	1.793	<0.001	1.275-2.522
TSH	0.877	0.269	10.629	2.404	0.001	1.419-4.072
Positive TPOAb	0.687	0.311	4.880	1.988	0.028	1.081-3.657
ALB	-0.339	0.211	2.581	0.712	0.109	0.471-1.077
IL-6	0.485	0.141	11.832	1.624	<0.001	1.232-2.141
TC	0.684	0.411	2.770	1.982	0.097	0.886-4.435

BMI: body mass index; TSH: thyroid stimulating hormone; TPOAb: thyroid peroxidase antibody; ALB: albumin; IL-6: interleukin-6; TC: total cholesterol.

3 讨论

老年人群甲状腺功能异常率高,这与随着年龄的增长,机体组织对甲状腺激素的利用度不断降低以及衰老导致的腺体萎缩问题相关^[4,5]。由于甲状腺结节存在恶变可能,故需行手术切除,其中单侧甲状腺叶切除术是治疗单侧叶甲状腺病变的重要术式,但患者术后甲状腺功能恢复及甲减问题依旧是临床关注的重点^[6,7]。

术后残余甲状腺功能与术后甲减密切相关。正常情况下,切除单侧甲状腺叶后1个月左右,对侧残余甲状腺腺体体积将增长25%,以发挥代偿作用,维持甲状腺功能^[8]。本研究结果显示,中青年患者甲状腺单侧叶切除术后短期内FT3及TSH水平存在波动,但均在术后6个月恢复至术前水平。而老年组患者单侧甲状腺叶切除术后1年,各指标水平均未恢复至术前水平,提示老年患者术后残余甲状腺增生代偿能力降低,甲状腺功能减退程度相对严重。本研究中,老年组患者术后1年甲减发生率远高于中青年组。

术前TSH及TPOAb与术后甲减相关性的报道较多,有研究认为,术前TSH水平过高即提示甲状腺储备减少,而TPOAb阳性将促进TSH生成,同时通过提高淋巴细胞浸润程度促进甲减发生^[9,10]。本研究结果显示,术前TSH及TPOAb是引起老年单侧甲状腺叶切除术后甲减的危险因素,且年龄、BMI及IL-6也是老年患者单侧甲状腺叶切除术后甲减的危险因素。年龄越大,患者残余甲状腺组织增长及代偿能力越差,出现甲减的风险越大,建议将老年甲状腺结节患者作为术后甲减高发人群,注意该类人群的术后随访^[11,12]。有研究表示,BMI过高可能通过瘦素、胰岛素等细胞因子对甲状腺激素的影响,增加糖尿病患者亚临床甲减发生风险^[13,14]。本研究结果显示,BMI越高,老年单侧甲状腺叶切除术后甲减发生率也越高,但肥胖在增加术后甲减发生风险中的具体作用机制还不明确,但建议老年肥胖患者术后积极控制体质量。有研究表示IL-6可阻断

TSH释放,抑制甲状腺过氧化物酶信使RNA合成,减少TT3产生,促进甲减发生,但其具体作用机制依旧处于研究阶段^[15]。

综上,老年单侧甲状腺叶切除术后甲状腺功能恢复情况差于中青年组,更易发生甲减,术前TSH升高、TPOAb阳性、年龄、BMI及IL-6均与术后甲减关系密切。

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