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# 颅内动脉瘤开颅术后患者肺部感染的危险因素分析 *

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**摘要 目的:**探讨颅内动脉瘤开颅术后发生肺部感染的危险因素。**方法:**回顾性分析在我院接受开颅手术治疗的 211 例颅内动脉瘤患者的性别、年龄、吸烟史、糖尿病史、高血压病史、Hunt-Hess 分级、动脉瘤部位、动脉瘤直径、手术时机及术后肺部感染的情况，对可能导致肺感染的因素行 $X^2$ 检验及 Logistic 回归分析。**结果:**单因素分析显示影响颅内动脉瘤患者术后肺感染的因素主要包括年龄、吸烟、糖尿病、Hunt-Hess 分级($P<0.05$)。多因素 Logistic 回归分析结果显示影响颅内动脉瘤患者开颅术后发生肺部感染的因素为吸烟和 Hunt-Hess 分级。**结论:**吸烟、高 Hunt-Hess 分级是影响颅内动脉瘤开颅术后发生肺部感染的独立危险因素。

**关键词:**颅内动脉瘤;肺部感染;开颅手术;危险因素

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# Analysis of the Risk Factors of Pulmonary Infection after Craniotomy in Patients with Intracranial Aneurysms*

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**ABSTRACT Objective:** To analyze the risk factors of pulmonary infection after craniotomy in patients with intracranial aneurysms. **Methods:** The clinical data of 211 cases of patients with intracranial aneurysms who received craniotomy in our hospital were collected. Univariate analysis of variance by $X^2$ test and multivariate analysis by multiple Logistic regression model were carried out to screen risk factors (sex, age, smoking, diabetes, hypertension, location of aneurysms, Hunt-Hess classification, time of operation and diameter of aneurysms) related to pulmonary infection after craniotomy. **Results:** Univariate analysis showed that age, smoking, diabetes and Hunt-Hess classification were the risk factors of pulmonary infection after craniotomy in patients with intracranial aneurysms; multivariate logistic regression analysis showed that smoking and Hunt-Hess classification were independent risk factors of pulmonary infection after craniotomy of intracranial aneurysms. **Conclusion:** Smoking and Hunt-Hess classification were the independent risk factors of pulmonary infection after craniotomy in patients with intracranial aneurysms.

**Key words:** Intracranial aneurysms; Pulmonary infection; Craniotomy; Risk factor

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## 前言

颅内动脉瘤是一种常见的、多发的脑血管疾病，各个年龄段皆可发病，其破裂导致的蛛网膜下腔出血会使 30%~50%患者在最初两周内死亡，存活患者可能留有不同程度的残疾[1,2]。目前，开颅显微镜下动脉瘤夹闭术仍是治疗动脉瘤的主要方法之一，但因其创伤大，术后恢复较慢、需长时间卧床等因素，极易引起肺部感染，从而加重病情，延长患者的住院时间，增加住院费用，提高病死率[3]。本文回顾性研究 211 例颅内动脉瘤患者的相关情况，旨在分析影响开颅术后患者肺部感染的相关因素，为临床诊治提供依据。

## 1 资料与方法

### 1.1 一般资料

选取我院 2011 年 1 月 ~2014 年 1 月行开颅手术治疗的动脉瘤患者 211 例。其中，男 93 例，女 118 例，性别比为 1:1.26。患者年龄为 32~76 岁，平均为(53.2± 10.4)岁。发生术后肺感染的患者为 152 例，总体肺感染率为 72.04%。

### 1.2 入选标准

对患者病例资料回顾性研究，包括既往史、现病史、体格检查、常规辅助检查及 DSA 检查、Hunt-Hess 分级[4]等。所有病例均经脑血管数字造影(DSA)确诊为颅内单发动脉瘤，且行开颅显微镜下动脉瘤夹闭术。设立观察变量 9 项。其中，性别、吸烟史(> 10/ 支，超过 1 年)、糖尿病史、高血压病史等以 2 级变量定义；入院病情以 Hunt-Hess 分级定义为 2 级；动脉瘤按部位定义为 2 级；年龄以 40 岁和 60 岁分为 3 级；动脉瘤大小按≤ 3mm，3~10 mm，≥ 10 mm 定义分为 3 级；手术时间按早期手术(≤ 3 天)，间期手术(3~14 天)，延期手术(≥ 14 天)分为 3 级。排

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除发病前有肺部感染史及其他肺部疾病史 (如支气管扩张、哮喘等),凡在发病 48 小时后出现下列情况中任意三项可确立诊断肺感染:①出现咳嗽咳痰、胸闷、胸痛等呼吸系统症状;②双肺可闻及干、湿啰音,呼吸音减弱或 / 和不同程度的肺实变体征;③体温≥ 37.5℃ ,伴有白细胞计数≥ 10× $10^9$/L;④胸 X 线或 CT 呈炎性改变;⑤痰培养有致病菌生长。

### 1.3 统计学方法

采用 SPSS15.0 统计软件进行所有数据分析,各变量先行单因素分析后,选有统计学意义的因素进行非条件 logistic 模型分析,以 P< 0.05 为差异具有统计学意义。

## 2 结果

### 2.1 单因素分析

单因素分析显示影响颅内破裂动脉瘤患者术后肺感染的因素主要有:年龄、吸烟、糖尿病、Hunt-Hess 分级(P< 0.05)。

**表 1 影响颅内动脉瘤开颅术后患者发生肺部感染的单因素分析**

Table 1 Univariate analysis of the influencing factors of pulmonary infection after craniotomy in patients with intracranial aneurysms

| Index | Group | Infection | Non-infection | $X^2$ | P |
|---|---|---|---|---|---|
| Sex | Male | 73 | 20 | 2.892 | 0.100 |
| | Female | 79 | 39 | | |
| Age(Year) | ≤ 40 | 11 | 13 | 10.421 | 0.010 |
| | 40~60 | 112 | 40 | | |
| | ≥ 60 | 29 | 6 | | |
| Smoking | Yes | 65 | 14 | 5.791 | 0.025 |
| | No | 87 | 45 | | |
| Diabetes | Yes | 29 | 4 | 4.857 | 0.050 |
| | No | 123 | 55 | | |
| Hypertension | Yes | 58 | 25 | 0.164 | 0.750 |
| | No | 94 | 34 | | |
| Location | Anterior circulation | 146 | 57 | 0.045 | 0.900 |
| | Posterior circulation | 6 | 2 | | |
| H-H | Ⅰ~Ⅲ | 106 | 57 | 15.970 | 0.005 |
| | Ⅳ~Ⅴ | 46 | 2 | | |
| Diameter | ≤ 3 mm | 12 | 5 | 0.064 | 0.750 |
| | 3~10 mm | 93 | 35 | | |
| | ≥ 10 mm | 47 | 19 | | |
| Time | ≤ 3 d | 93 | 38 | 0.208 | 0.975 |
| | 3~14d | 44 | 16 | | |
| | ≥ 14d | 15 | 5 | | |

### 2.2 多因素分析

将单因素分析有统计学意义的因素,采用 Logistic 回归分析,结果显示影响颅内动脉瘤患者开颅术后肺感染的因素为吸烟和 Hunt-Hess 分级。Hunt-Hess 分级越高,颅内动脉瘤患者开颅术后肺部感染越严重;吸烟是颅内动脉瘤患者开颅术后发生肺部感染的一个独立危险因素。

**表 2 影响颅内动脉瘤开颅术后患者发生肺部感染的多因素 Logistic 回归分析**

Table 2 Logistic regression analysis of the influencing factors of pulmonary infection after craniotomy in patients with intracranial aneurysms

| Index | β | S.E. | $X^2$ | P | OR | OR95%CI | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower limit | Upper limit |
| H-H | 1.719 | 0.688 | 6.610 | 0.013 | 5.521 | 1.432 | 21.283 |
| Diameter | 0.147 | 0.439 | 0.112 | 0.738 | 1.158 | 0.490 | 2.737 |
| Smoking | 1.302 | 0.486 | 7.170 | 0.007 | 3.678 | 1.418 | 9.541 |
| Age | -0.180 | 0.373 | 0.233 | 0.629 | 0.835 | 0.402 | 1.734 |

## 3 讨论

颅内动脉瘤仅次于脑血栓形成及高血压脑出血，位于脑血管意外的第三位[5]。开颅手术治疗动脉瘤可利用显微技术准确定位动脉瘤及附近血管结构，手术可操作性强，并有较高治愈率，必要时亦可重建血管[1,6,7]。因创伤大，术后肺部感染成为影响颅内动脉瘤患者预后的一个重要因素。本组病例术后总体肺部感染率为 72.03%，较其他报告稍高，考虑与开颅手术创伤大、患者术后卧床时间长有关[8]。

有关年龄与肺部感染的关系一直有着两种截然相反的观点。Brilstra[9]对比 65 岁以下与 66 岁以上患者的预后，发现 65 岁以下的老年患者肺部感染较重。而大多数研究支持年龄与术后肺感染呈正相关[10,11]。本组以 40 岁和 60 岁作为界点将患者分为三组，各组的感染率依次为 45.83%、73.68%及 82.86%，相互比较差异有统计学意义，提示随着年龄的增加，患者肺部感染率逐渐增高。

吸烟可引起多种肺部疾病，如慢性支气管肺炎、肺气肿和间质性肺疾病等，这些疾病可诱发或加重动脉瘤术后肺部感染[12]。本组吸烟与不吸烟患者术后肺感染率分别为 82.28%和 65.91%，单因素及多因素分析均支持吸烟为影响颅内动脉瘤术后发生肺部感染的独立危险因素。加强翻身扣背和吸痰，促进痰液排除，同时尽早给予营养支持，尤其重要的是早期胃肠营养支持，以增加患者抵抗力，可以有效降低颅内动脉瘤术后肺部感染的发生[13]。

近年来，有关糖尿病与动脉瘤术后肺部感染关系的研究越来越多。高血糖能增加机体的分解代谢，造成负氮平衡，组织蛋白合成障碍，增加感染机会，使组织愈合能力差。有研究表明糖尿病加重颅内动脉瘤患者的肺部感染几率[14]。本研究发现术前高血糖的患者术后肺感染率较正常者明显增加，但多因素 Logistic 回归分析未进入方程，提示糖尿病影响动脉瘤术后肺感染的因素是复杂的，是多方面的[15]。

国内外多项研究均证实 Hunt-Hess 分级是影响动脉瘤预后的重要因素[16,17]。本组研究结果显示 Hunt-Hess 分级是影响颅内动脉瘤术后肺部感染的独立危险因素，Hunt-Hess 分级愈高，患者意识愈差，病情愈重，肺感染愈重。本组Ⅳ～Ⅴ级患者术后肺感染率达 90%以上，其中有约 63%的患者需行气管切开术。

总之，颅内动脉瘤开颅术后肺部感染的发生受多种因素影响，但吸烟和 Hunt-Hess 分级是影响颅内动脉瘤开颅术后发生肺部感染的独立危险因素。

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