低倍镜图像特征评估在宫颈细胞学筛查中的价值

陆建军[1]　　赵光明[2]
苏州大学附属苏州九院病理科，江苏苏州　215200

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Value of low-power architectural pattern assessment in cervical lesion screening

LU Jianjun[1]　ZHAO Guangming[2]
(Department of Pathology，Suzhou Ninth Hospital Affiliated to Soochow University，Suzhou 215200，Jiangsu China)

[Abstract] Objective To investigate the adjunctive diagnostic value of low-power(×4) microscopic features.**Methods** Thirty-five false-negative missed cases with initial cytology of Negative for Intraepithelial Lesion or Malignancy (NILM) and histologically verified lesions between January 2020 and June 2025 were enrolled as the study group, with 10 CINⅡ+ and 20 endometrial tumors with positive cytology as positive controls, and 20 cytology-negative cases without histological lesions as negative controls. Suspicious features were screened under low-power(×4) microscopy and verified under medium or high power. Two junior pathologists evaluated the slides before and after training.**Results** The abnormal detection rate in the study group was 85.7% (30/35); hyperchromatic crowded groups (HCGs) were the most significant feature (82.9%, 29/35). HCG detection rates differed significantly in both cervical and endometrial subgroups (P=0.019, P<0.001). Post-training detection improved significantly (P<0.001), with good interobserver agreement (*Kappa*=0.723).**Conclusion** Low-power(×4) microscopic features offer adjunctive diagnostic value for severe cervical and endometrial lesions prone to missed diagnosis, helping reduce the false-negative rate.

[Key words] Liquid-based cytology (LBC); Cervical lesions; Two-step method; Low-power architectural pattern; Hyperchromatic crowded cell groups (HCG)

[1]**通讯作者**：陆建军，电子信箱: 274713038@qq.com

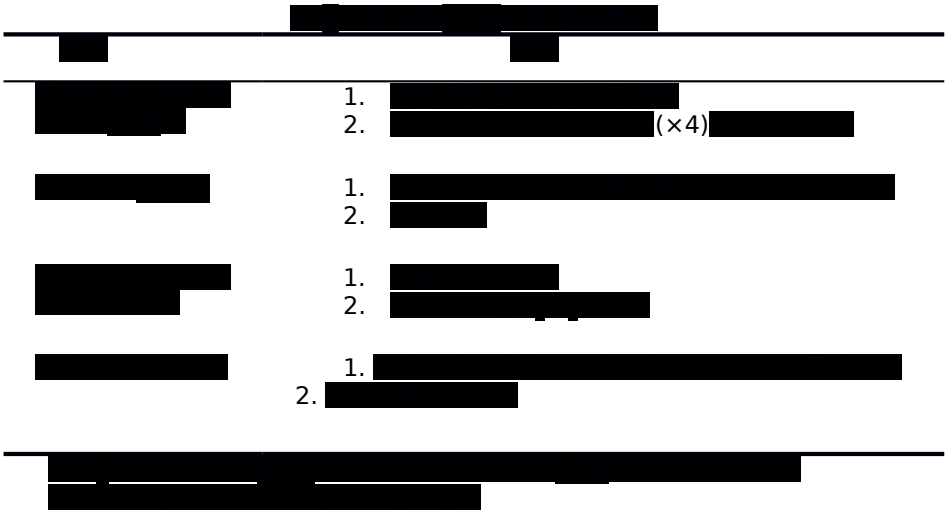
(×4)并论证其可重复性。

atypical squamous cells of undetermined significance，ASC-US）

(×4)

(×4)本研究设置洗脱期为 2 周（不同阅片方式观察同一病例的间隔），以消除图像记忆偏倚。

(×4)



宫颈细胞学贝塞斯达报告系统（the bethesda system for reporting cervical cytology，TBS）(×4)

(×4)

否则采用 *Fisher-Freeman-Halton* 精确检验（R×C 表）。

1.4　伦理　本研究严格遵守学术研究伦理规范，所有数据匿名处理，仅用于本次论文研究，严格保护隐私，并经伦理委员会审批同意（审批号：KYLW2026-036-01）。

2　结果

2.1　低倍镜(×4)特征 [redacted](×4)[redacted]

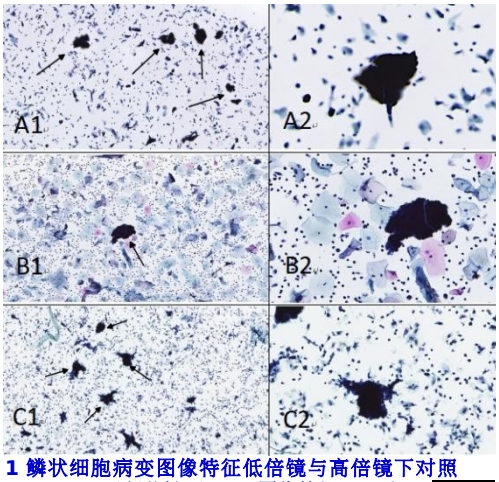


图 1 鳞状细胞病变图像特征低倍镜与高倍镜下对照
A1、B1、C1 示低倍镜下 HCG 图像特征　巴氏，4×10；A2、B2、C2 示对应高倍镜下为肿瘤性 HCG，致密厚实、扁平状、核浆比高　巴氏，20×10

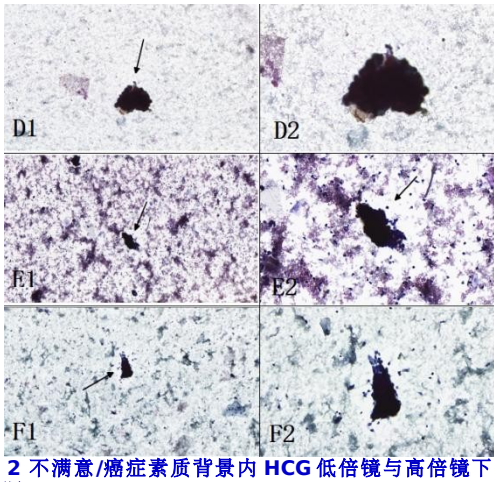


图 2 不满意/癌症素质背景内 HCG 低倍镜与高倍镜下对照
D1、E1、F1 示低倍镜下细胞稀少背景内 HCG 图像特征　巴氏，4×10；D2、E2、F2 示对应高倍镜下为肿瘤性 HCG，致密厚实、核浆比高　巴氏，20×10

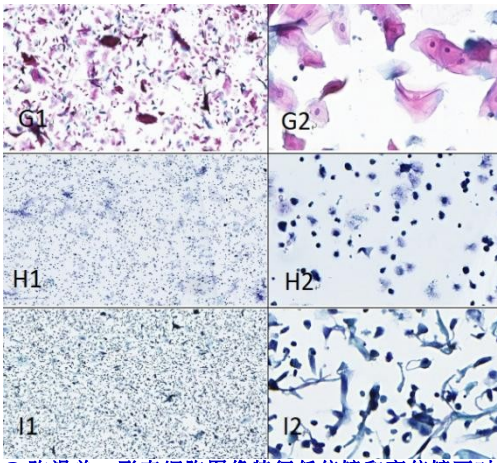


图 3 弥漫单一形态细胞图像特征低倍镜和高倍镜下对照
图 G1、H1、I1 分别示低倍镜下弥漫性过度角化、弥漫淋巴样细胞及弥漫性梭形细胞图像特征　巴氏，4×10；G2、H2、I2 分别示对应高倍镜下为疣状癌（细胞缺乏/轻度异型）、小细胞癌及梭形鳞状细胞癌细胞　巴氏 20×10

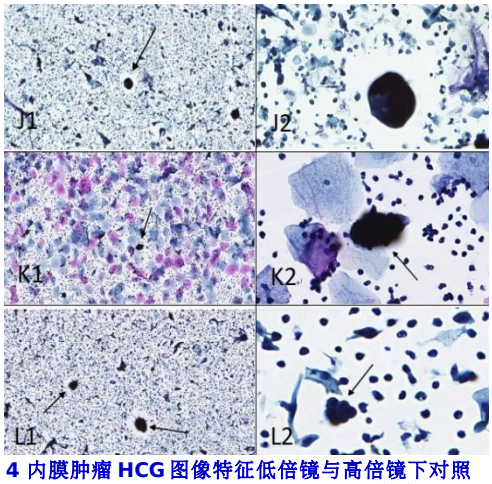


图 4 内膜肿瘤 HCG 图像特征低倍镜与高倍镜下对照
图 J1、K1、L1 示低倍镜下可见深染的细胞（小）团　巴氏，4×10；右列对应高倍镜图，J2 示三维立体 HCG，K2 示桑葚样 HCG，L3 示微乳头样 HCG　巴氏，20×10

表 2　研究组低倍镜(×4)下观察统计[*n*(%)]

	(69.2)	(91.0)	(82.9)
	(7.7)	(0)	(2.9)
	(23.1)	(0)	(8.6)
	(23.1)	(9.1)	(14.3)

表注：计数方式为各特征在

[*n*(%)]

	7(70.0)	5(25.0)	13(69.2)	8.342	0.019
	18(90.0)	3(15.0)	20(91.0)	34.46	<0.001

～

, %

	60.0（39/65）	83.1(54/65)	56.9（37/65）	80.0(52/65)
	100（20/20）	100(20/20)	95.0（19/20）	95.0(19/20)
	100（39/39）	100(54/54)	97.4（37/38）	98.1(52/53)
	43.5（20/46）	64.5(20/31)	40.4（19/47）	59.4(19/32)
	69.4（59/85）	87.1(74/85)	65.9（56/85）	83.5(71/85)

观察者间一致性 *Kappa*= 0.723（95% *CI*:0.544～0.857）, *P*< 0.001

B、C的 *McNemar* 检验

～

而对低倍镜(×4)下特征关注不足。 (×4)

异常细胞仅以 HCG 形式呈现时，漏诊风险显著攀升[8]，是最常见的假阴性原因之一。HCG 通常良性，但也是多种严重病变的常见特征，仔细鉴别肿瘤性 HCG 既必要也是难点。

HCG (×4) 34%的 宫颈涂片中有 HCG，(×4) 低于文献，可能与漏诊病例肿瘤性 HCG 不典型、制片质量不佳或诊断辨识能力不足有关 (×4) (×4) (×4) (×4) (×4) (×4) (×4) (×4) (×4) 。(×4) (×4) 研究指出，非典型腺细胞检出率和阳性率在各实验室间存在巨大差异，诊断一致性仅 30%左右。研究组中 如能发现内膜癌诊断线索，有助临床提高早期检出率。 Wu 等研究 (×4) (×4)

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[redacted]阴性对照组仅 20 例，假阴性占比高[redacted](×4)[redacted]

[redacted](×4)[redacted]

[redacted](1)[redacted]

[redacted](2)[redacted](×4)[redacted](3)[redacted]

[redacted](4)[redacted]

(5)[redacted]

[redacted]

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