

Diagnostic Limitations of Colposcopy in Cervical Adenocarcinoma in Situ: An Analysis of 16 Cases

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Summary

Cervical adenocarcinoma in situ (AIS) remains a challenging lesion for colposcopic diagnosis because it frequently develops within the endocervical canal and often presents with subtle or non-specific findings. In this retrospective analysis of 16 AIS cases, pathological upstaging to invasive carcinoma was identified in 62.5% after diagnostic conization, including microinvasive and early-stage disease. AGC was the most common cytological abnormality, and HPV positivity was frequent, but neither cytology nor colposcopy alone reliably predicted invasive disease. These findings highlight the limited diagnostic accuracy of colposcopy for glandular lesions and emphasize the essential role of diagnostic conization for accurate assessment and appropriate treatment planning.

Baseline characteristics of the patients

Case	age	cervical cytology	colposcopy-directed biopsy	endometrial cytology	HPV	Diagnosis (conization)	cut end	Extent (mm)	Depth (mm)
1	45	ASC-H	AIS+CIN1	—	+	CC1A1(adenocarcinoma)	—	5	2
2	41	AIS	adenocarcinoma	—	+	CC1A2(adenocarcinoma)	—	3	3.5
3	41	AGC	AIS	±	+	CC1A2(adenocarcinoma)	—	6.5	4
4	50	AIS	adenocarcinoma	—	—	CC1A2(adenocarcinoma)	—	4	3.5
5	39	AGC	AIS	—	+	CC1A2(adenocarcinoma)	—	5	4
6	39	AGC	AIS+CIN2	—	+	CC1B1(adenocarcinoma)	—	12	2.5
7	46	adenocarcinoma	AIS	—	+	CC1B1(adenocarcinoma)	—	15	4.5
8	47	AIS	AIS	—	+	CC1B1(adenocarcinoma)	—	14	7
9	36	AGC	AIS	—	+	CC1B1(adenocarcinoma)	—	8	3
10	26	AIS	AIS	—	+	CC1A1 (adenosquamous carcinoma)	+	1	1
11	48	AGC	AIS	—	+	AIS	+		
12	40	AGC	AIS	—	+	AIS	—		
13	62	AGC	AIS	±	—	AIS	—		
14	38	AGC	adenocarcinoma	—	+	AIS	—		
15	64	AGC	AIS	±	—	AIS	—		
16	46	AIS	AIS	—	—	AIS	—		

► In the final pathological diagnosis after conization, invasive carcinoma was identified in **10 of 16 cases (62.5%)**, while **6 of 16 cases (37.5%)** remained diagnosed as AIS. Notably, more than 60% of patients preoperatively suspected of AIS or glandular lesions were ultimately diagnosed with invasive carcinoma after diagnostic conization.

► On cervical cytology, AGC was observed in 8 cases, AIS in 5 cases, ASC-H in 1 case, and adenocarcinoma in 1 case, with AGC and AIS accounting for the majority of cases. These findings suggest that AIS and early adenocarcinoma do not always present as typical HSIL-like abnormalities, and glandular cytological abnormalities such as AGC or AIS may provide important diagnostic clues.

Colposcopy-directed biopsy frequently resulted in a diagnosis of AIS, while only a minority of cases were initially diagnosed as adenocarcinoma. However, final pathological examination after conization revealed invasive carcinoma in 10 cases. These findings suggest that even when AIS is diagnosed by colposcopy-directed biopsy, invasive disease may still be present, highlighting the limitations of biopsy alone in accurately assessing stromal invasion.

Comparison of Colposcopic Findings

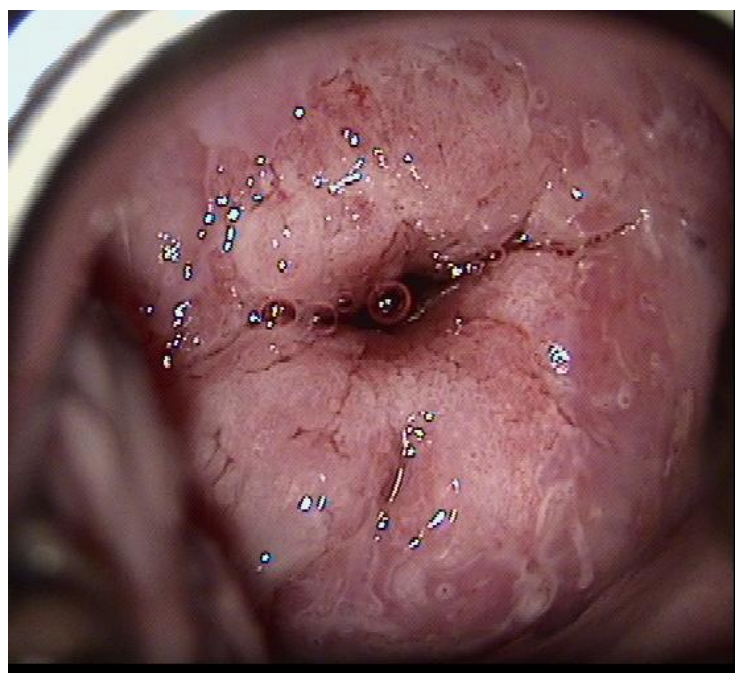
Feature	Typical Colposcopic Features of Cervical Glandular Lesions	
	AIS	Adenocarcinoma
Location	Predominantly endocervical	Endocervical with stromal extension
Visibility	Often subtle / difficult to visualize	More obvious / destructive lesion
Acetowhitening	Thin, faint, indistinct	Dense or irregular acetowhitening
Surface pattern	Flat or slightly irregular	Papillary, villoglandular, nodular
Lesion border	Indistinct	Irregular, destructive
Gland opening involvement	Common (cuffed crypt openings)	May be present
Bleeding / Friability	Usually absent or minimal	Common
Atypical vessels	Rare or absent	Frequently present
Necrosis / Erosion	Rare	May be present
Typical impression	Subtle glandular lesion	Destructive invasive lesion

Feature	Comparison with Squamous HSIL	
	HSIL / CIN2-3	Glandular Lesions (AIS / Adenocarcinoma)
Acetowhitening	Dense	Thin to irregular
Border	Sharp	Indistinct
Mosaic	Common	Rare
Punctuation	Common	Rare
Endocervical extension	Less common	Common
Atypical vessels	Sometimes	More common in invasive lesions
Bleeding	Uncommon	Common in invasive lesions

Colposcopic Findings in Patients with Cervical Glandular Lesions Diagnosed by Diagnostic Conization

Case1

Absence of Typical Major Colposcopic Findings Does Not Exclude AIS

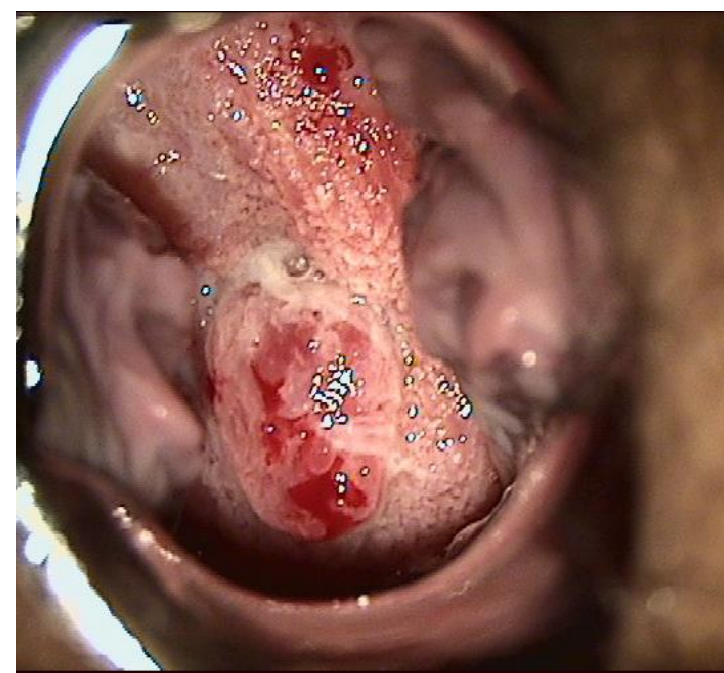


- Thin acetowhite epithelium
- Indistinct borders
- Possible glandular involvement
- Endocervical extension
- Flat lesion
- No mosaic, punctuation, or atypical vessels

colposcopy-directed biopsy: AIS+CIN1
diagnosis(conization): adenocarcinoma

Case4

Colposcopic findings suspicious for invasive glandular disease.



- Acetowhite epithelium
- Dense acetowhitening (focal)
- Irregular papillary/granula surface
- Friability with contact bleeding
- Irregular lesion borders
- Possible endocervical extension
- Atypical vessels limited by bleeding

colposcopy-directed biopsy: AIS
diagnosis(conization): adenocarcinoma

Case2

Major colposcopic findings suggestive of HSIL (CIN2/3)

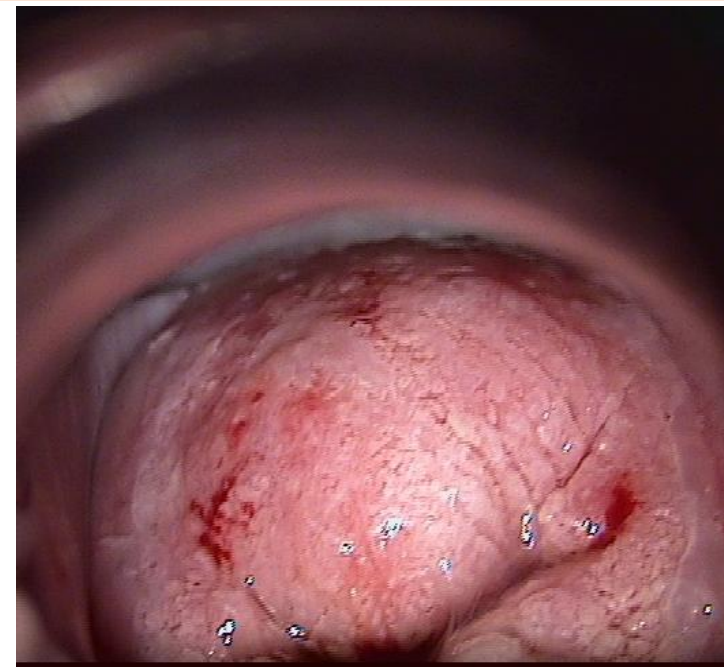


- Dense acetowhite epithelium
- Sharp border
- Irregular surface contour
- papillary appearance
- No atypical vessels
- Lesion surrounding the external os
- Transformation zone: Type 1-2

colposcopy-directed biopsy: adenocarcinoma
diagnosis(conization): adenocarcinoma

Case5

AIS Can Be Present Without Typical Major Colposcopic Findings.

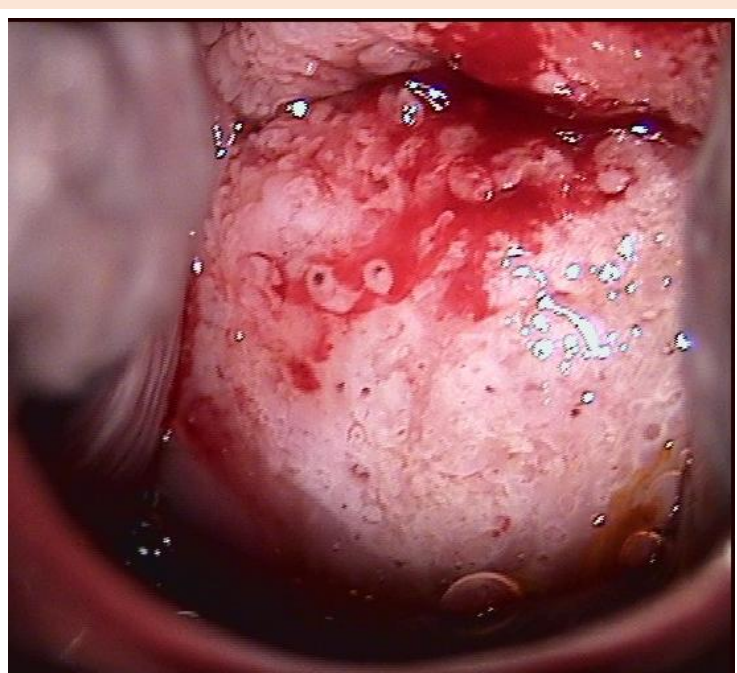


- Acetowhite epithelium
- Thin to intermediate acetowhitening
- Partially indistinct borders
- Smooth surface with mild irregularity
- Focal surface erosion
- No mosaic, punctuation, or atypical vessels
- Possible endocervical extension

colposcopy-directed biopsy: AIS
diagnosis(conization): adenocarcinoma

Case16

Abnormal glandular lesion suspicious for AIS.



- Acetowhite epithelium
- Dense o intermediate acetowhitening
- Irregular papillary/granular surface
- Gland opening involvement
- Surface erosion with contact bleeding
- Irregular lesion borders
- Possible endocervical extension
- No obvious mosaic or punctuation

colposcopy-directed biopsy: AIS
diagnosis(conization): AIS

Typical colposcopic findings of cervical adenocarcinoma differ from those of squamous lesions. Unlike HSIL, glandular lesions are often located mainly within the endocervical canal and may be difficult to visualize completely.

AIS usually presents as subtle acetowhite changes with indistinct borders and glandular involvement, often without typical major colposcopic findings such as mosaicism or punctuation. In contrast, invasive adenocarcinoma tends to show irregular papillary or nodular surfaces, friability, contact bleeding, atypical vessels, and possible necrotic or erosive changes.

Conclusion

The subtle and often non-specific colposcopic appearance of cervical glandular lesions limits the diagnostic accuracy of colposcopy alone. Given the high risk of occult invasive disease and the difficulty in assessing lesion extent, diagnostic conization remains essential for definitive diagnosis and optimal clinical management.

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