

# La Consensus international de Kyoto sur la gastrite: quelle utilité en pratique clinique ?

Dr Rachel HALLIT  
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# CANCER GASTRIQUE



## Incidence:

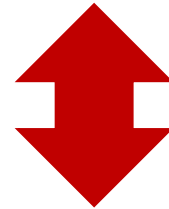
-4e hommes  
-7e femmes.

## Mortalité:

-4e hommes  
-5e femmes  
-survie à 5 ans =25 %



Incidence en diminution  
d'environ 1,8% par an



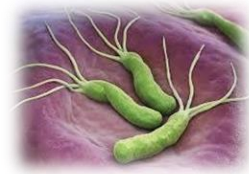
**Dépistage de H. PYLORI**



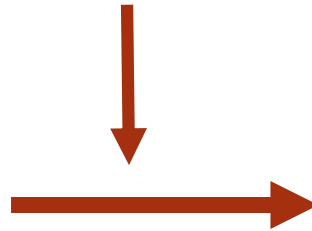
↳ 50% du  
risque de CG

*Sung et al, 2021*  
*Defossez et al, 2019*

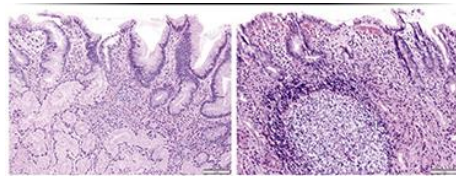




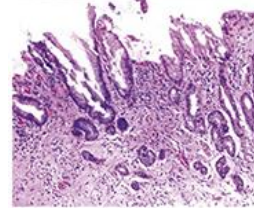
Muqueuse normale



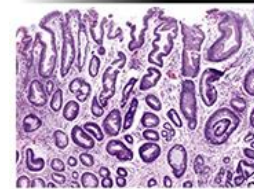
Gastrite



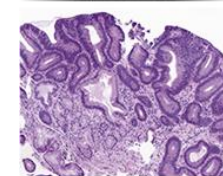
Atrophie



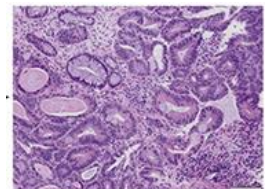
Métaplasie intestinale



Dysplasie



Cancer Gastrique

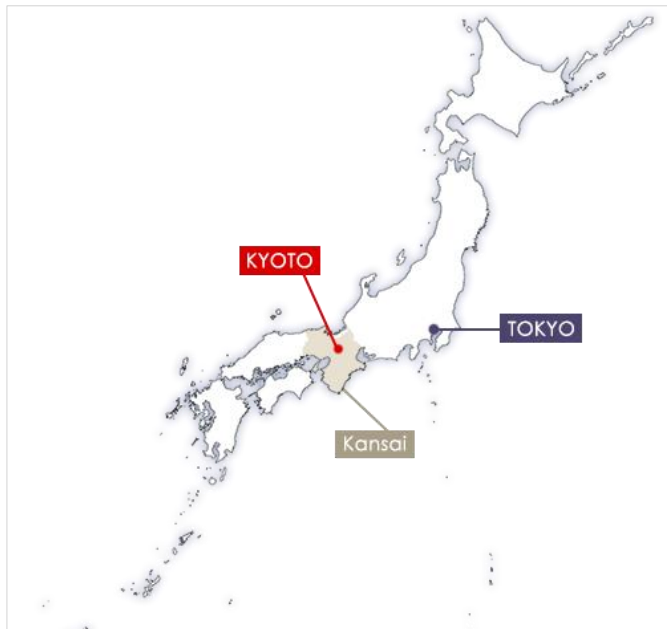


**Endoscopie**

**Histologie**

**Gastrite**

**Lumière blanche/NBI  
Kyoto classification**



**Updated Sydney system USS**



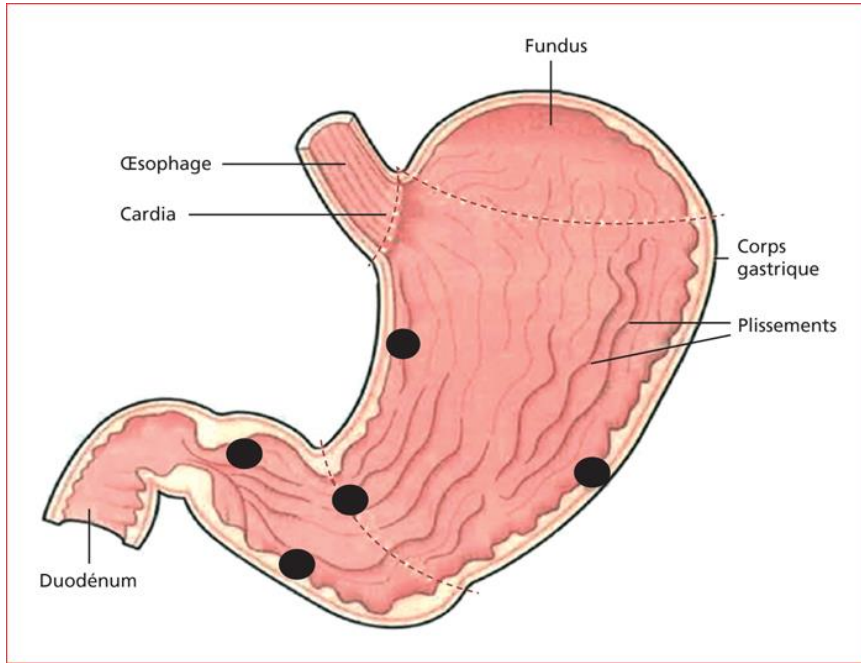
[Review](#) > [Am J Surg Pathol.](#) 1996 Oct;20(10):1161-81.

doi: 10.1097/00000478-199610000-00001.

**Classification and grading of gastritis. The updated Sydney System. International Workshop on the Histopathology of Gastritis, Houston 1994**

M F Dixon <sup>1</sup>, R M Genta, J H Yardley, P Correa

# Pour rappel



## OLGA

Atrophy score		Corpus			
		No atroph (score 0)	Mild atrophy (score 1)	Moderate atrophy (score 2)	Severe atrophy (score 3)
Antrum (Including incisura angularis)	No atroph (score 0)	Stage 0	Stage I	Stage II	Stage II
	Mild atrophy (score 1)	Stage I	Stage I	Stage II	Stage III
	Moderate atrophy (score 2)	Stage II	Stage II	Stage III	Stage IV
	Severe atrophy (score 3)	Stage III	Stage III	Stage IV	Stage IV

## OLGIM

IM score		Corpus			
		No IM (score 0)	Mild IM (score 1)	Moderate IM (score 2)	Severe IM (score 3)
Antrum (Including incisura angularis)	No IM (score 0)	Stage 0	Stage I	Stage II	Stage II
	Mild IM (score 1)	Stage I	Stage I	Stage II	Stage III
	Moderate IM (score 2)	Stage II	Stage II	Stage III	Stage IV
	Severe IM (score 3)	Stage III	Stage III	Stage IV	Stage IV

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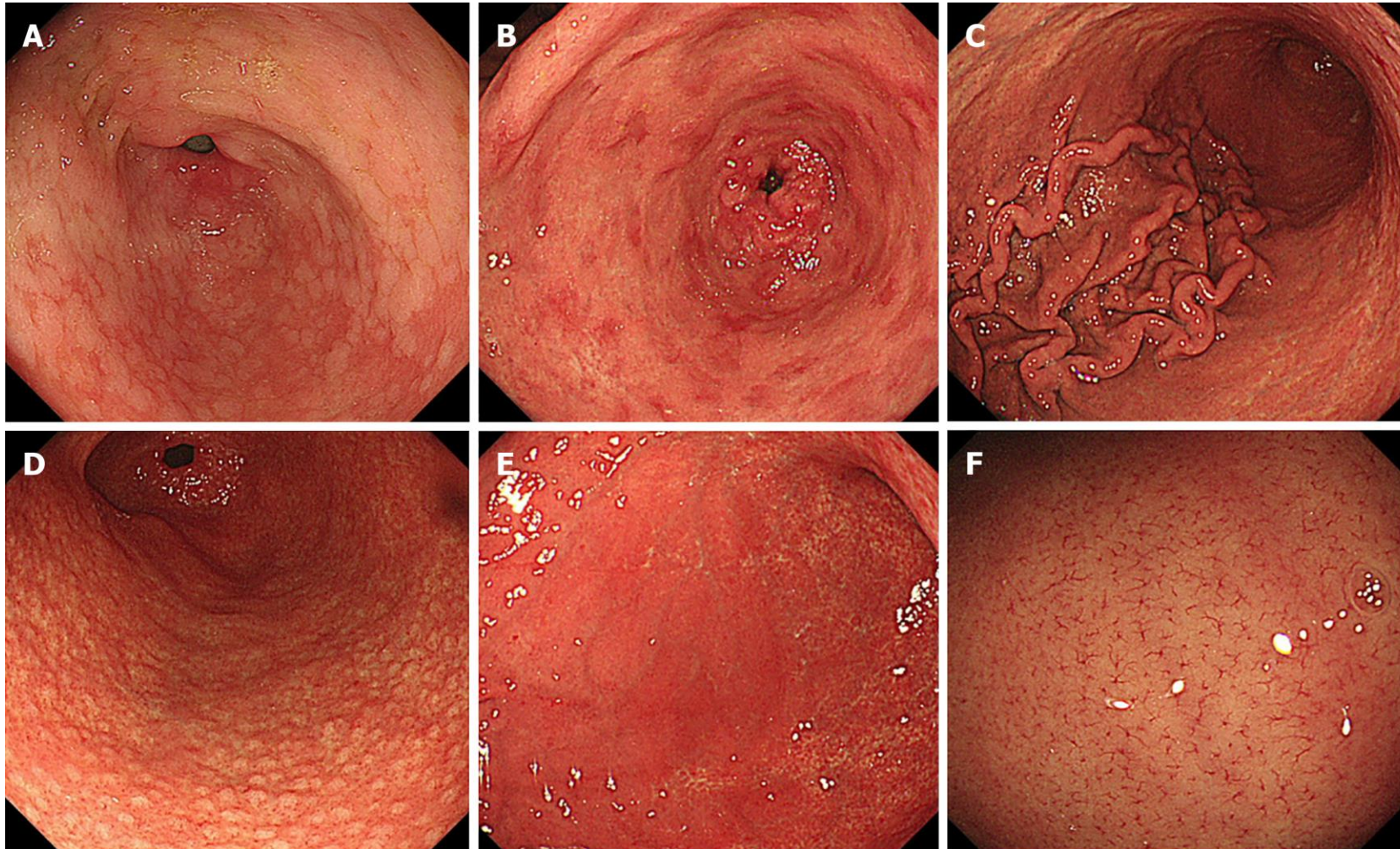


# Classification de Kyoto

- 85<sup>e</sup> congrès de la Société Japonaise d'Endoscopie Digestive en **2013**.
- Nouvel outil d'évaluation de la gastrite
- Score purement endoscopique et évaluation de la globalité de l'estomac (vs biopsies ?)
- Nouveau score modifié récemment élaboré pour la prédiction du cancer (autorisation de la chromo virtuelle pour la MI)
- Standardisation de la description d'une gastrite



# Classification de KYOTO: Quelles anomalies rechercher ?

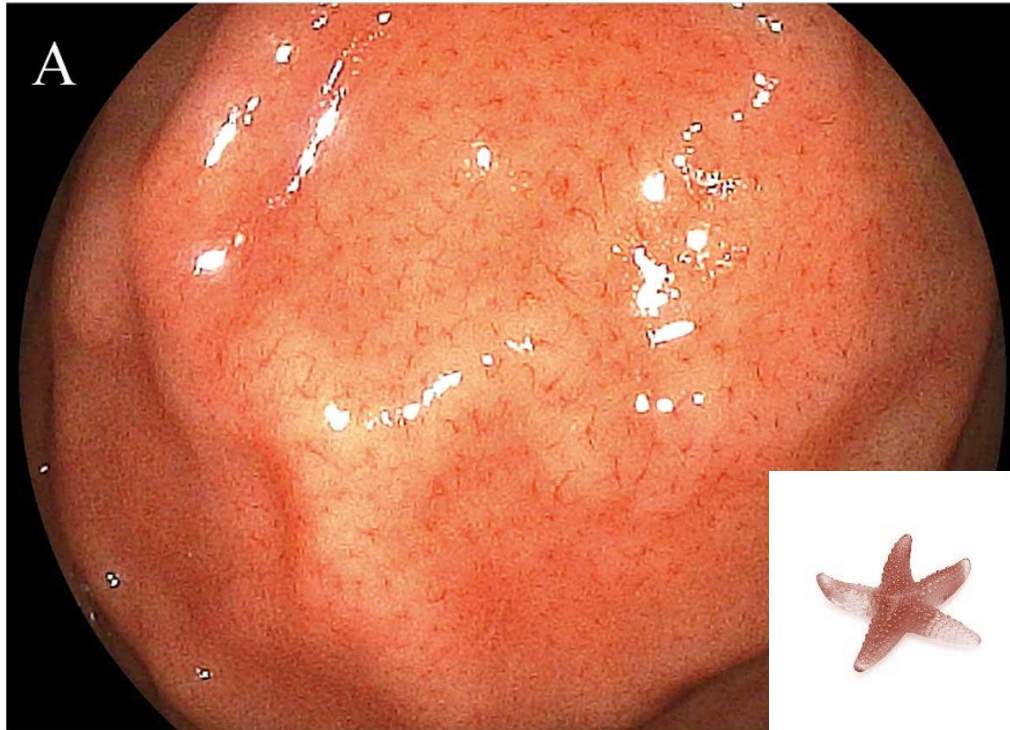


Toyoshima O, Nishizawa T, Koike K. Endoscopic Kyoto classification of *Helicobacter pylori* infection and gastric cancer risk diagnosis. *World J Gastroenterol* 2020

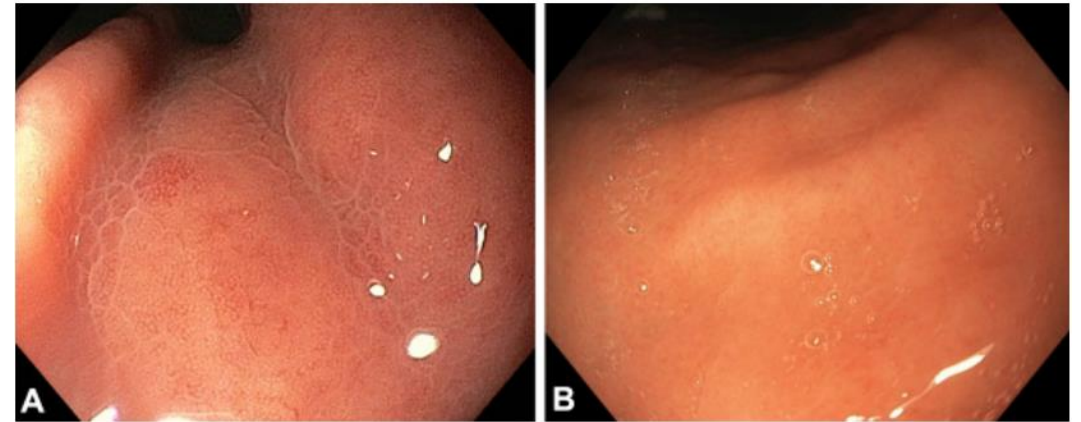


# La classification de Kyoto

## Disposition régulière des veines collectrices (RAC)



- Aspect de points rouges minuscules en forme d'étoile de mer
- Surtout au niveau du corps – petite courbure
- Facteur prédictif d'absence de l'*H. Pylori* : Se = 80% - Sp ~ 95%  
(Glover B et al. 2020)
- RAC ⇔ **l'absence** de l'*H. Pylori*: OR = 4.5 – 55



Katake, Y. Irregular arrangement of collecting venules (IRAC) provides a critical endoscopic insight in *Helicobacter pylori*-induced gastritis: A secondary publication. *Biomedical Reports* (2013)

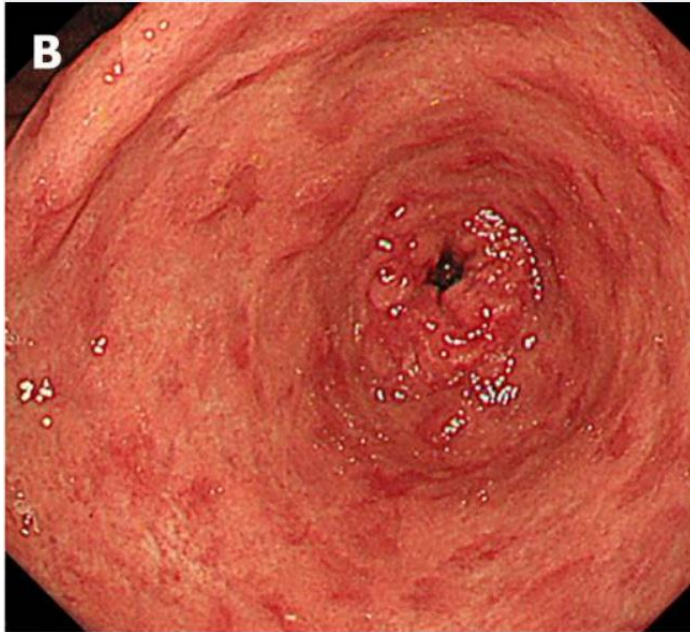
Garcés-Durán R, García-Rodríguez A et al.. Association between a regular arrangement of collecting venules and absence of *Helicobacter pylori* infection in a European population. *Gastrointest Endosc.* 2019 Sep;90(3):461-466. doi: 10.1016/j.gie.2019.05.027. Epub 2019 May 17.





# La classification de Kyoto

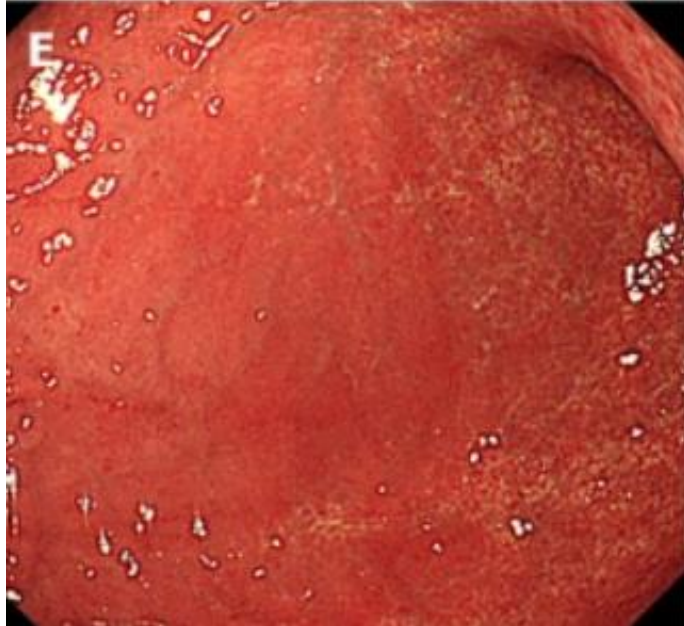
Map – Like redness (MLR) ou érythème (patchy) tacheté, en mosaïque



- L'aspect est le résultat du Contraste entre muqueuse atrophique et non atrophique après disparition de l'érythème
- Spécifique d'une infection **antérieure** à HP: OR = 7.8 – 13
- C'est très typique d'un aspect post éradication de l'H. Pylori
- Association avec la **MI dans 87%**



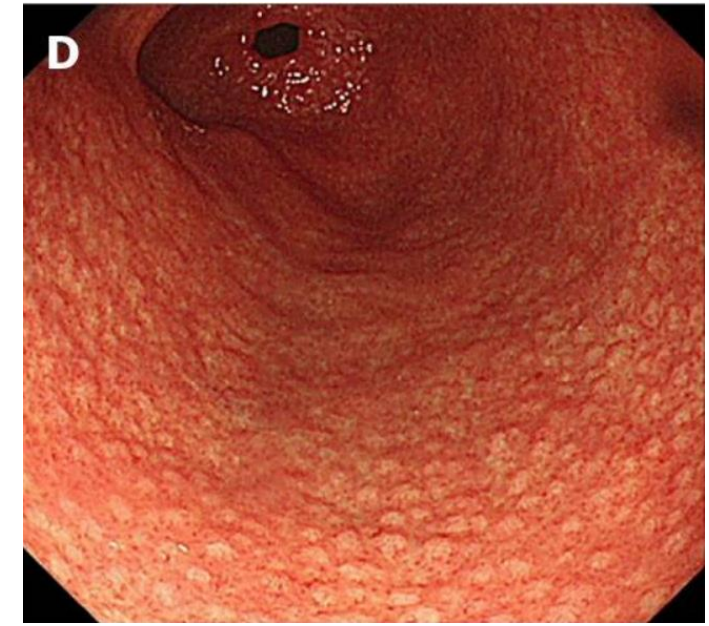
# La Classification de Kyoto



**Erythème diffus continu:**  
typique de **Gastrite**  
**superficielle**



**Larges plis** : > 5 mm et persistants ou  
ne disparaissant que partiellement à  
l'insufflation



**Nodularité** :  
Aspect de miliaire ou en chaire de poule

**Signes endoscopiques évocateurs d'une infection active par l'HP:**

**Nodularité OR = 4 – 22**

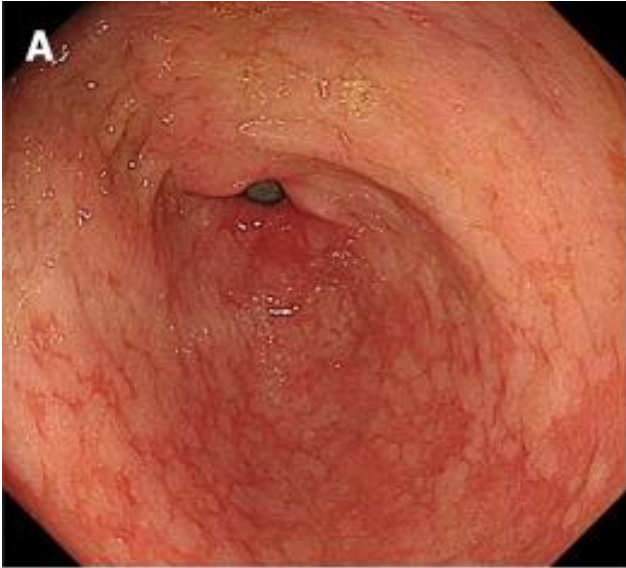
**Larges plis : OR = 6 – 8**

**Erythème diffus : OR = 10-26**



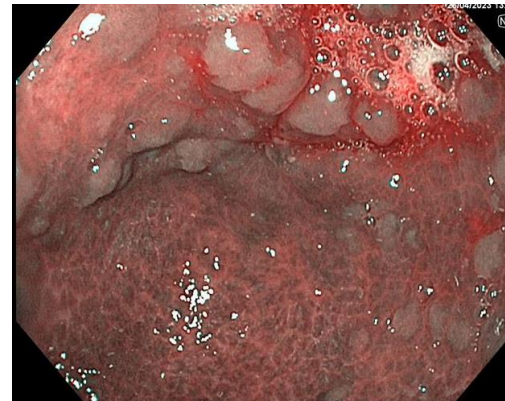
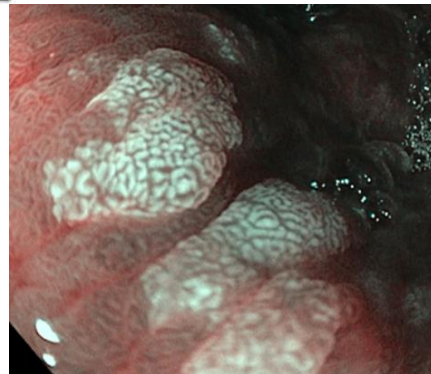
# La Classification de Kyoto

## Métaplasie Intestinale



**Plaques ou crêtes légèrement surélevées blanchâtres**

→ Surface irrégulière

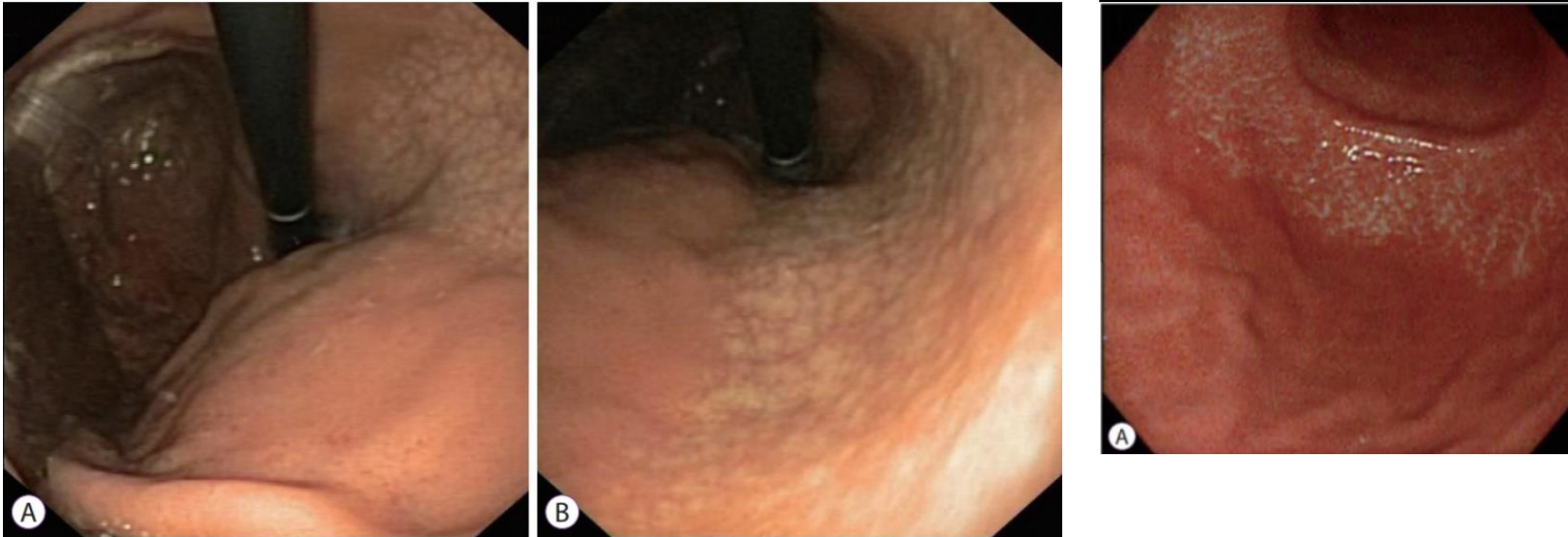


**Aspect vilieux des glandes de surface**

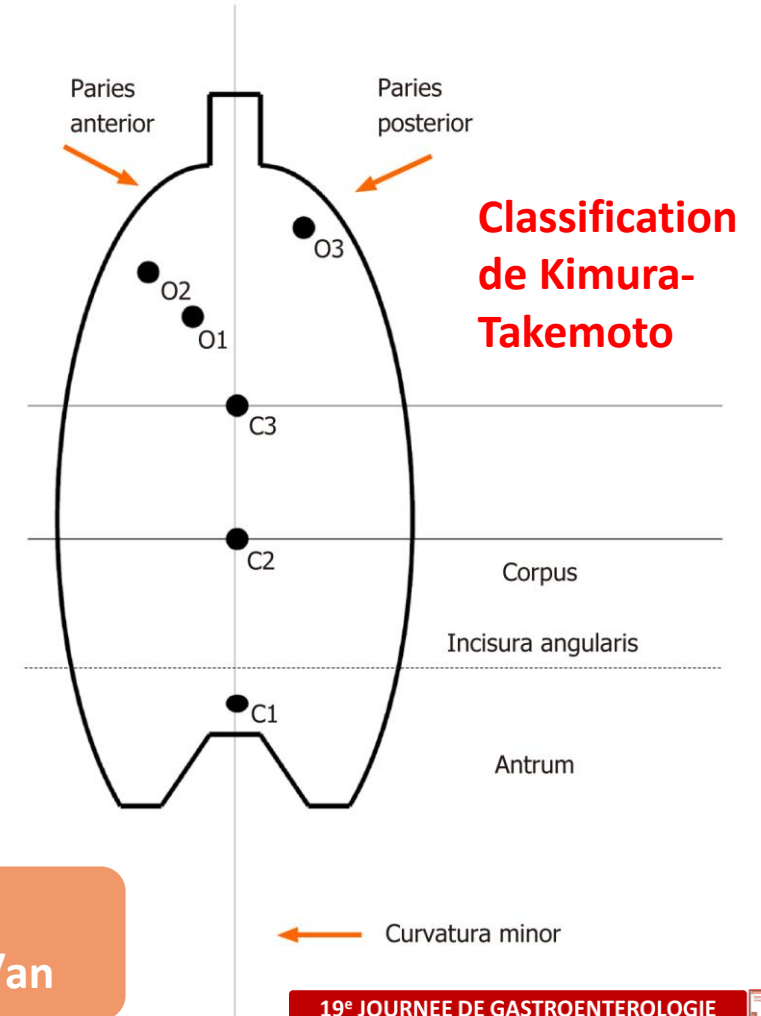


# La Classification de Kyoto

## Atrophie muqueuse



Quach DT, Hiyama T. Assessment of Endoscopic Gastric Atrophy according to the Kimura-Takemoto Classification and Its Potential Application in Daily Practice. Clin Endosc. 2019 Jul;52(4):321-327.



Risque de CG corrélé à la sévérité de l'atrophie:

Légère : R = 0.04 – 0.10%/an    modérée: 0.12%-0.34%/an    sévère:0.31-1.6%/an



# Classification de Kyoto et l'infection H. Pylori

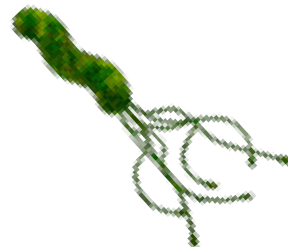
Arrangement  
régulier des  
veinules

**Non** infection par  
H. Pylori

Nodularité  
Plis larges (> 5 mm)  
Erythème diffus

+/- Atrophie , MI

Infection **active**  
par H. Pylori



Erythème  
*patchy*

+/- Atrophie , MI

Infection **antérieure**  
par H. Pylori



# Kyoto et la corrélation aux données histologiques

ORIGINAL ARTICLE - GASTROENTEROLOGY (CLINICAL)

## Consistency between the endoscopic Kyoto classification and pathological updated Sydney system for gastritis: A cross-sectional study

Osamu Toyoshima,\* Toshihiro Nishizawa,\*<sup>†</sup> Shuntaro Yoshida,\* Tatsuya Matsuno,\*<sup>‡</sup> Nariaki Odawara,\*<sup>§</sup> Akira Toyoshima,<sup>¶</sup> Kosuke Sakitani,\*<sup>||</sup> Hidenobu Watanabe,\*\* Mitsuhiro Fujishiro<sup>‡,††</sup> and Hidekazu Suzuki<sup>‡‡</sup>

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### Key words

Endoscopy, Gastritis, *Helicobacter pylori*, Kyoto classification, Pathology, Updated Sydney system.

Accepted

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**Author contributions:** Osamu Toyoshima is responsible for the conception of article, drafting of article, reviewing of endoscopic images, statistical analysis, critical review, and final manuscript approval; Toshihiro Nishizawa is responsible for drafting of article, critical review, and final manuscript approval; Shuntaro Yoshida, Tatsuya Matsuno, Nariaki Odawara, Akira Toyoshima, Kosuke Sakitani, Mitsuhiro Fujishiro, and Hidekazu Suzuki are responsible for the critical review and final manuscript approval; Hidenobu Watanabe is responsible for pathological diagnosis, critical review, and final manuscript approval.

**Financial support:** There is no funding declaration.

**Guarantor of the article:** Osamu Toyoshima, MD, PhD.

### Abstract

**Background:** Two methods are used to evaluate gastritis: the updated Sydney system (USS) with pathology and Kyoto classification, a new endoscopy-based diagnostic criterion. Their results are un-

clearly correlated. We evaluated for consistency between endoscopy, and intestinal metaplasia, enlarged

corpus, 57.9%; 450 endoscopic gastritis cases in the Kyoto classification were associated with high corpus and antral USS

scores for neutrophil activity and chronic inflammation. A subanalysis was performed for *H. pylori*-positive patients. Regarding atrophy and intestinal metaplasia, endoscopic findings were associated with USS scores. Enlarged folds, nodularity, and diffuse redness were associated with high corpus USS scores for neutrophil activity and chronic inflammation, but with low antral USS scores for atrophy and intestinal metaplasia. The Kyoto classification scores were also associated with the pathological topographic distribution of neutrophil activity and intestinal metaplasia.

**Conclusions:** Among *H. pylori*-positive individuals, endoscopic and pathological diagnoses were consistent with atrophy and intestinal metaplasia. Enlarged folds, nodularity, and diffuse redness were associated with pathological inflammation (neutrophil activity and chronic inflammation) of the corpus; however, they were inversely associated with pathological atrophy and intestinal metaplasia. The endoscopy-based Kyoto classification of gastritis partially reflects pathology.

Etude transversale  
717 EOGD pour une gastrite  
450 Gastrites à HP+

Bonne prédiction de la topographie et la distribution de l'inflammation et l'activité des PNN

Concordance des scores endoscopiques pour l'atrophie et MI avec les données histologiques.

Association entre larges plis / nodularités / érythème diffus et activité des PNN en histologie.

Les larges plis / nodularités / érythème diffus sont inversement corrélés à la présence de l'atrophie ou de la MI



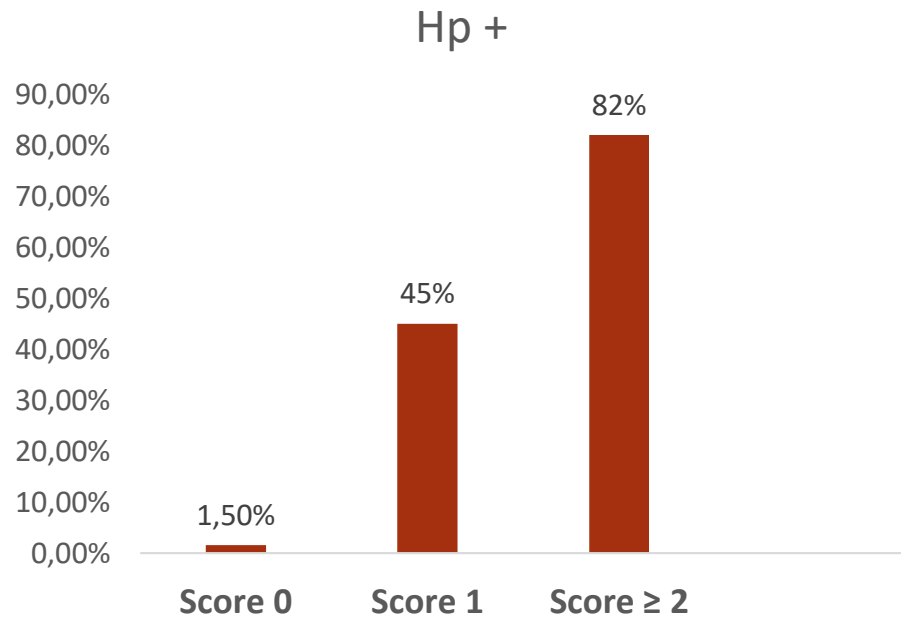
# Le score de KYOTO: Comment le calculer?

Signes endoscopiques	0 point	1 point	2 points
Atrophie	Absente / C1	C2/3	O1-3
Métaplasie intestinale (seulement si vue en lumière blanche)	Absente	Antrale	Corps et antrale
Plis larges	Absents	Présents	-
Nodularité	Absente	Présente	-
Erythème diffus	Absent	Léger avec disposition régulière des veinules (RAC)	Sévère sans RAC

**Score total entre 0 et 8**

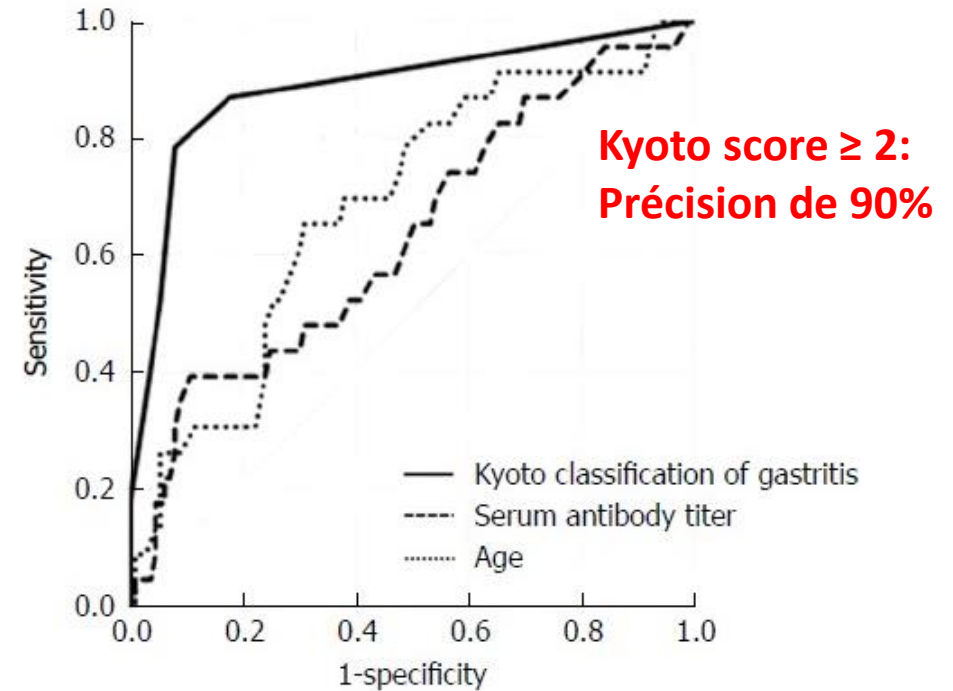


# Kyoto et l'infection par H. Pylori



**Score ≥ 2 : Prédiction d'une infection à H. Pylori**

Score = 0 : Absence d'infection par H. Pylori



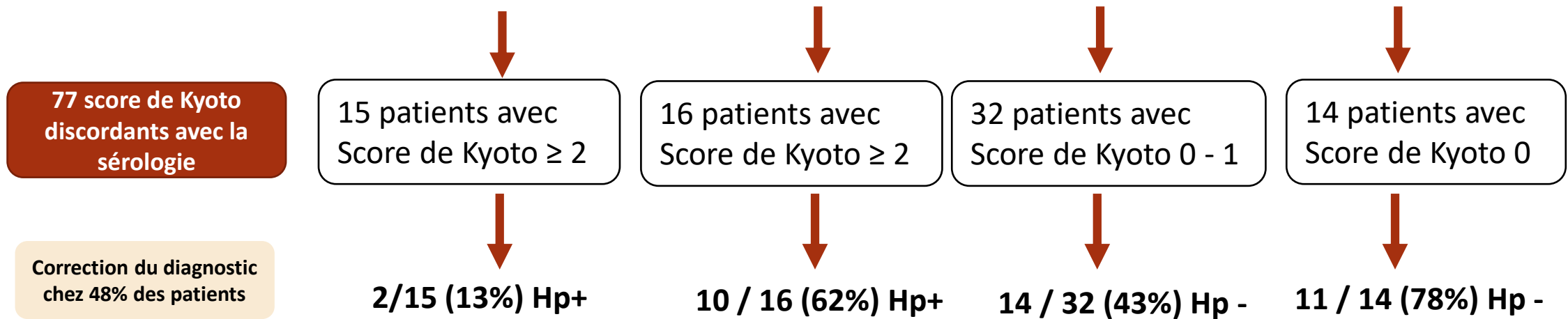
Toyoshima O et al. *H. Helicobacter pylori* infection in subjects negative for high titer serum antibody. *World J Gastroenterol.* 2018





# Score de Kyoto et l'infection par H. Pylori

Kyoto Score	Sérologie fortement négative (< 3)	Sérologie faiblement négative (3 – 10)	Sérologie faiblement positive (10 – 50)	Sérologie fortement positive (> 50 U/ml)
	n=612	n=139	n=74	n=45



Nishizawa T, et al. A combination of serum anti-Helicobacter pylori antibody titer and Kyoto classification score could provide a more accurate diagnosis of H pylori. United European Gastroenterol J. 2019 Apr;7(3)



# Score de Kyoto et l'infection par H. *Pylori*

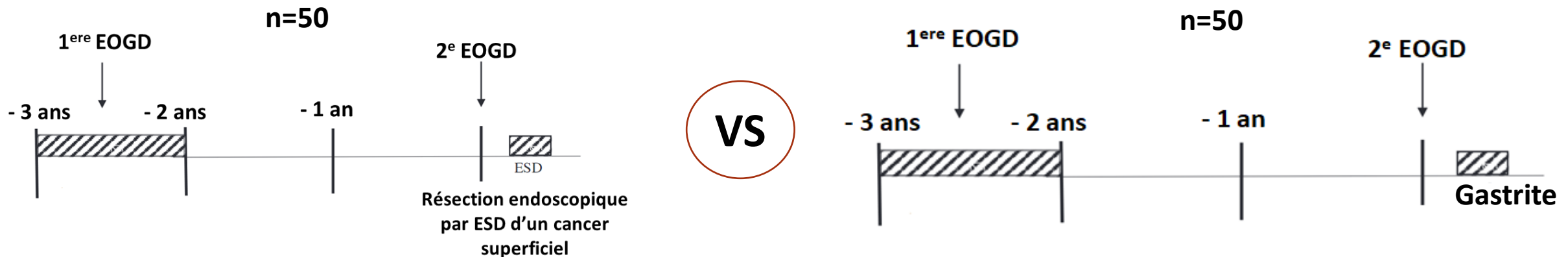
Kyoto Score	Sérologie fortement négative (< 3)	Sérologie faiblement négative (3 – 10)	Sérologie faiblement positive (10 – 50)	Sérologie fortement positive (> 50 U/ml)
	n=612	n=139	n=74	n=45

Ne pas se contenter de la sérologie seule pour éliminer une infection à H. *Pylori*

Si discordance sérologie / Kyoto → Biopsies ou test à l'urée marquée → Correction du diagnostic dans 48% des cas

# Score de Kyoto et le risque de cancer ?

- Etude rétrospective, monocentrique, japonaise (2014 – 2020)
- Calcul rétrospectif du score de Kyoto sur la base de multiples photos (2 opérateurs)



# Score de Kyoto et le risque de cancer ?

- Etude rétrospective, monocentrique, japonaise (2014 – 2020)
- Calcul rétrospectif du score de Kyoto sur la base de multiples photos (2 opérateurs)

## Score calculé à la première gastroscopie

	Control	Case group	<i>P</i> value
Number	50	50	
Atrophy	1.84 ± 0.37	1.98 ± 0.14	0.02
Intestinal metaplasia	0.84 ± 0.77	1.26 ± 0.80	0.01
Enlarged fold	0.40 ± 0.48	0.50 ± 0.51	0.32
Nodularity	0.04 ± 0.10	0.06 ± 0.24	0.65
Diffuse redness	0.94 ± 1.00	1.32 ± 0.89	0.04
Total score	4.00 ± 1.74	5.10 ± 0.58	0.003

## Facteurs de risque de cancer gastrique

	Univariate analysis		
	Odds ratio	95% CI	<i>P</i> value
Atrophy	9.33	1.62–176.7	0.04
Intestinal metaplasia	1.96	1.18–3.34	0.01
Enlarged fold	1.50	0.68–3.34	0.32
Nodularity	1.00	0.24–12.0	0.65
Diffuse redness	1.53	1.01–2.34	0.05



# Score de Kyoto et le risque de cancer

Table 4 Odds ratio for histological subtype of gastric cancer based on the Kyoto classification

	Ref.	<i>H. pylori</i> status	No. of subjects	No. of GC	No. of diffuse-type GC	No. of intestinal-type GC	OR for GC	OR for diffuse-type GC	OR for intestinal-type GC
Atrophy	Sekikawa <i>et al</i> [43], 2016	Current, past, and no infection	1823	29	3	26	7.4 <sup>1</sup>		
	Toyoshima <i>et al</i> [44], 2021	Current infection	499	132	39	93	2.8	2.3	6.2
	Kawamura <i>et al</i> [45], 2022	Current, past, and no infection	380	115	19	96	2.5 <sup>1</sup>		
Intestinal metaplasia	Shichijo <i>et al</i> [48], 2017	Current, past, and no infection	3392	107	22	85		0.2 <sup>2</sup>	
	Toyoshima <i>et al</i> [44], 2021	Current infection	499	132	39	93	1.6		1.7
Enlarged folds	Nishibayashi <i>et al</i> [81], 2003	Current infection	276	135	69	66	5.0		
	Toyoshima <i>et al</i> [44], 2021	Current infection	499	132	39	93			0.5
Nodularity	Nishikawa <i>et al</i> [53], 2018	Current infection	674	25	9	16		10.0	
	Toyoshima <i>et al</i> [44], 2021	Current infection	499	132	39	93	0.5		0.3
RAC	Kawamura <i>et al</i> [45], 2022	Current, past, and no infection	380	115	19	96	0.2 <sup>3</sup>		
Total Kyoto score	Toyoshima <i>et al</i> [44], 2021	Current infection	499	132	39	93	1.6	1.3	1.7
	Lin <i>et al</i> [61], 2022	Current, past, and no infection	1848	37	-	-	1.5		

Disposition régulière des veines → négativement associée au risque de CG

L'atrophie = facteur de risque de CG le plus important.  
16% des atrophies sévères → CG sur 10 ans



# Limitations du Score de Kyoto

- Données de la chromoendoscopie virtuelle non utilisées dans ce score.
- Seulement 2 des 5 items (atrophie et MI) sont prédictifs du cancer
- Etudes souvent mono/oligocentriques et/ou rétrospectives

## Création du score modifié de KYOTO



# Score Modifié de Kyoto

**Table 4** Univariate and multivariate analyses of endoscopic findings according to the Kyoto classification

	Number (%)		Univariate analysis		Multivariate analysis		β regression coefficient	Score
	GC group	Non-GC group	Odds ratio (95% CI)	P-value	Odds ratio (95% CI)	P-value		
<b>Atrophie</b>	Atrophy							
	C-0, C-1	9 (8)	90 (34)	1	–	1	–	–
	C-2, C-3	22 (19)	82 (31)	2.7 (1.9–6.1)	0.019	1.0 (0.4–2.8)	0.952	–
<b>MI</b>	Intestinal metaplasia (IEE-IM >30%)							
	None	44 (38)	180 (68)	1	–	1	–	–
	Antrum	12 (11)	19 (7)	2.6 (1.2–5.7)	0.016	1.7 (0.7–4.0)	0.211	–
<b>Plis larges</b>	Corpus							
	59 (51)	66 (25)	3.7 (2.3–5.9)	<0.001	2.2 (1.3–3.8)	0.003	0.806	1
	Fold enlargement							
<b>Nodularité</b>	Absent							
	101 (88)	236 (89)	1	–	1	–	–	–
	Present							
<b>Erythème diffus</b>	14 (12)		29 (11)	1.1 (0.6–2.2)	0.728	0.6 (0.3–1.2)	0.144	–
	Nodularity							
	Absent							
<b>Disposition régulière des veinules (RAC)</b>	111 (97)		256 (97)	1	–	1	–	–
	Present							
	4 (3)		9 (3)	0.8 (0.4–3.7)	0.968	1.7 (0.5–6.0)	0.435	–
<b>Erythème en mosaïque (MLR)</b>	Diffuse redness							
	None							
	56 (49)		157 (59)	1	–	1	–	–
<b>Disposition régulière des veinules (RAC)</b>	Minor, severe							
	59 (51)		108 (41)	1.5 (0.98–2.4)	0.073	1.0 (0.6–1.7)	0.943	–
	RAC in the angulus							
<b>Erythème en mosaïque (MLR)</b>	Visible							
	3 (3)		68 (26)	1	–	1	–	–
	Invisible							
112 (97)		197 (74)	12.9 (4.2–39.5)	<0.001	4.4 (1.1–18.0)	0.042	1.470	2
<b>Erythème en mosaïque (MLR)</b>	Map-like redness							
	None							
	94 (82)		245 (92)	1	–	1	–	–
Antrum								
4 (3)		10 (4)	1.0 (0.3–3.2)	0.945	0.8 (0.2–3.1)	0.826	–	
Corpus								
17 (15)		10 (4)	4.1 (2.0–9.9)	<0.001	2.5 (1.0–5.9)	0.043	0.901	1

GC, gastric cancer; IEE, image-enhanced endoscopy; IM, intestinal metaplasia; RAC, regular arrangement of collecting venules.



# Score modifié de KYOTO pour la prédiction du cancer

Signes endoscopiques	0 point	1 point	2 points
Atrophie	Absente / C1-3	O1-3	-
Métaplasie intestinale > 30% du corps (Inclusion du NBI)	Absente	Présente	-
Erythème « patchy » (MLR)	Non	Oui	-
RAC visible sur l'angulus	Oui	-	Non

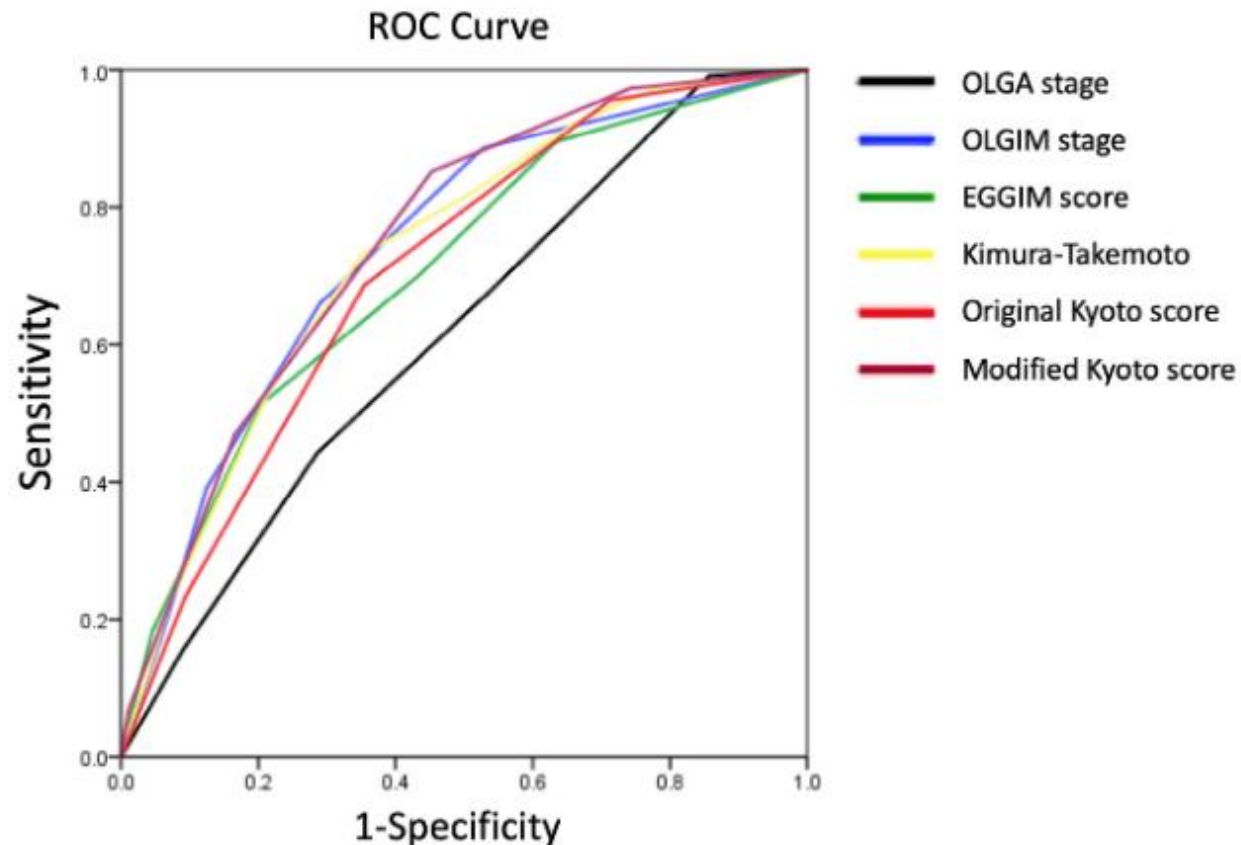
**Score total  
entre 0 - 5**

Bas risque	Risque intermédiaire	Haut risque
Score : 0-1	Score : 2-3	Score : 4-5
OR = 1	OR = 8.6 (2.6 – 26.7)	OR = 28 (8.7 – 88.7)





# Score modifié de KYOTO pour la prédiction du cancer



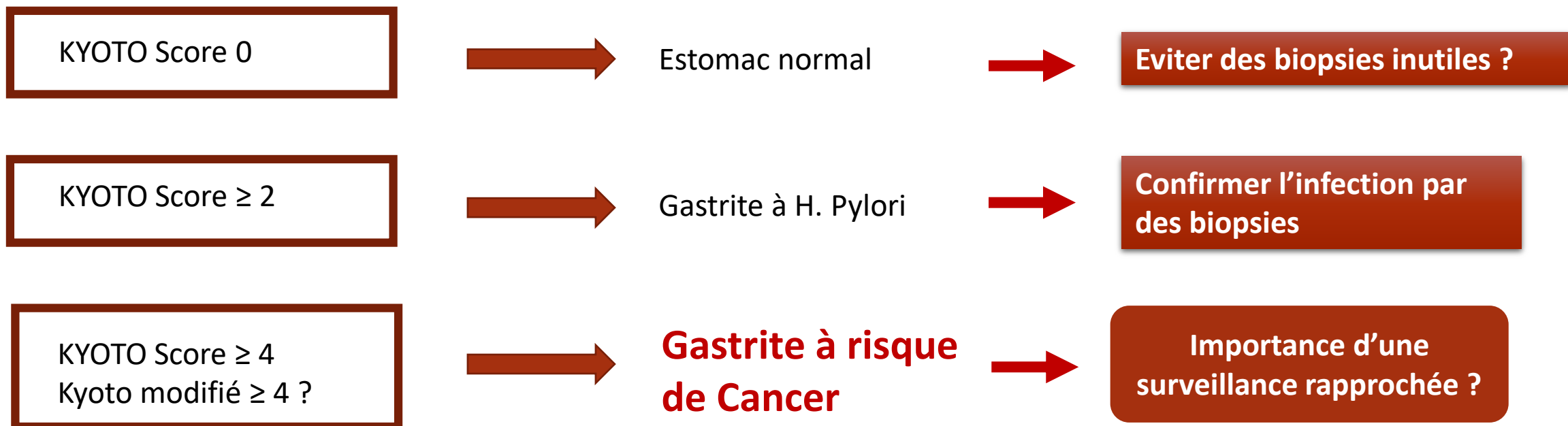
Score modifié de Kyoto :

**Association légèrement supérieure avec le cancer gastrique** (AUC = 0.75) vs score de Kyoto (AUC = 0.706; p = 0.052)

**Et performance comparable au score de OLGIM pour la prédiction du cancer** (AUC = 0.74; p = 0.7)

# KYOTO Classification Score

## Comment l'interpréter en pratique ?



# Conclusion

