

JNET classification of colorectal polyps



Samir Haffar, MD

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Milestones of narrow-band imaging

- **1999** NBI developed by Sano & Yoshida
- **2001** Red/green/blue filter was successfully created
- **2003** Surface & vessel patterns of GI tumors were seen
Improvements: noise reduction & color adjustment
- **2006** NBI launched by Olympus as final model
“Olympus Evis Lucera Spectrum”

Classifications of colorectal polyps based on NBI endoscopy

Year	Classification	Country	Magnifying endoscopy	Based on
2006	Sano ¹	Japan	yes	vessel pattern
2008	Hiroshima ²	Japan	yes	vessel & surface patterns
2009	Showa ³	Japan	yes	vessel pattern mainly
2009	Jikei ⁴	Japan	yes	vessel pattern mainly
2010	NICE ⁵	International	no	vessel & surface patterns

NBI: narrow band imaging – NICE: NBI international colorectal endoscopic classification

(1) Sano Y et al. Dig Endosc 2006; 18: S44–S51.

(2) Tanaka S et al. Gastrointest Endosc 2008; 50: 1289–97.

(3) Wada Y et al. Gastrointest Endosc 2009; 70: 522–31.

(4) Nikami T et al. Gastrointest Endosc 2009; 51: 10–19.

(5) Hewett DG et al. Gastroenterology 2012; 143: 599–607.

Why a new classification?

- Several validation studies reported the usefulness of NBI magnifying endoscopy in diagnosis of colorectal polyps
- Clinical studies raised the following concerns:
 - Multiple terms for same or similar findings
 - Necessity of including surface pattern in classifications
 - Differences in NBI findings in elevated & superficial lesions

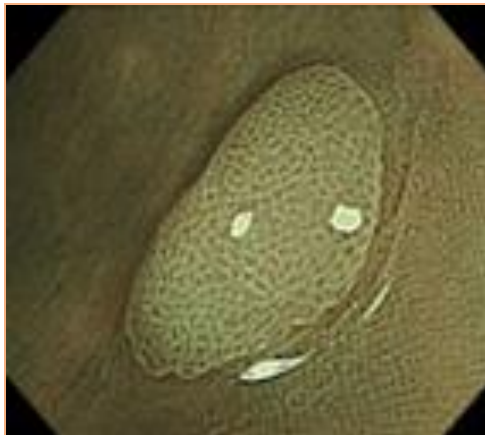
Need of universal classification unifying previous classifications

Japan NBI Expert Team (JNET)

formed in 2011

- 38 members specialized in colonoscopy from throughout Japan
- Web image study conducted by 25 specialists in colonoscopy
- Evaluation of NBI findings with histology of 100 NBI images
- Novel classification proposed in June 2014
- Using **magnifying endoscopy** & **narrow band imaging** (NBI)
- Two specific features: **vessel pattern** & **surface pattern**
- **Four types**: 1 – 2A – 2B – C

JNET classification type 1

Vascular pattern	Invisible
Surface pattern	Regular dark or white spots Similar to surrounding normal mucosa
Most likely diagnosis	Hyperplastic polyp (HP) Sessile serrated polyp (SSP)
Endoscopic image	

JNET classification type 1

Hyperplastic polyp (HP)



The JNET classification, Part 1/2

https://drive.google.com/file/d/1UDdyCqF_-4QwO_o9t5O28PD2KBVdjN4o/view?usp=sharing

JNET classification type 1

Sessile serrated polyp (SSP)



The JNET classification, Part 1/2

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JNET classification type 1

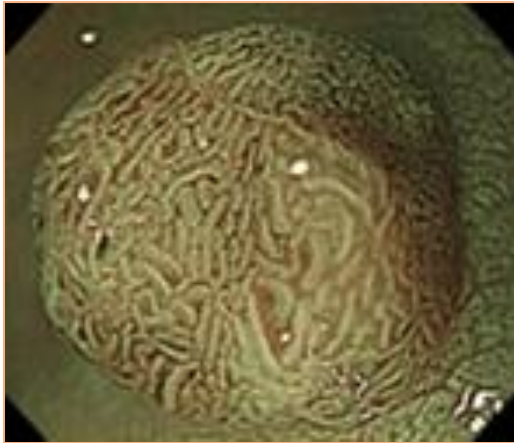
Sessile serrated polyp (SSP)



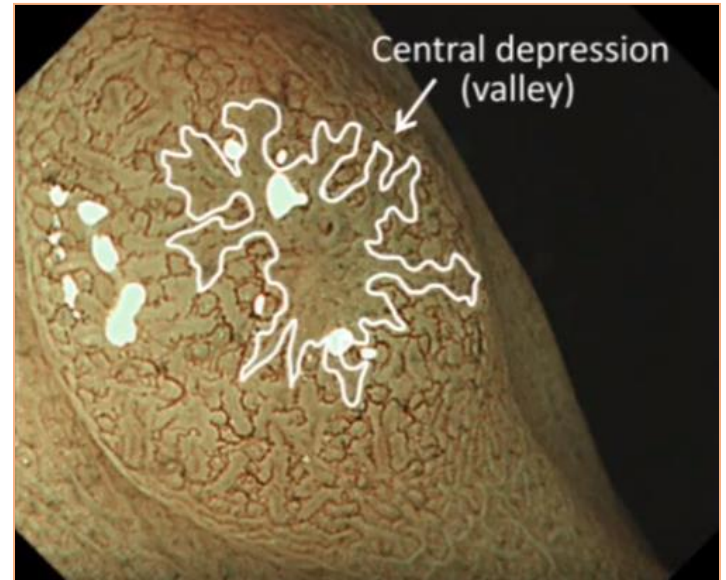
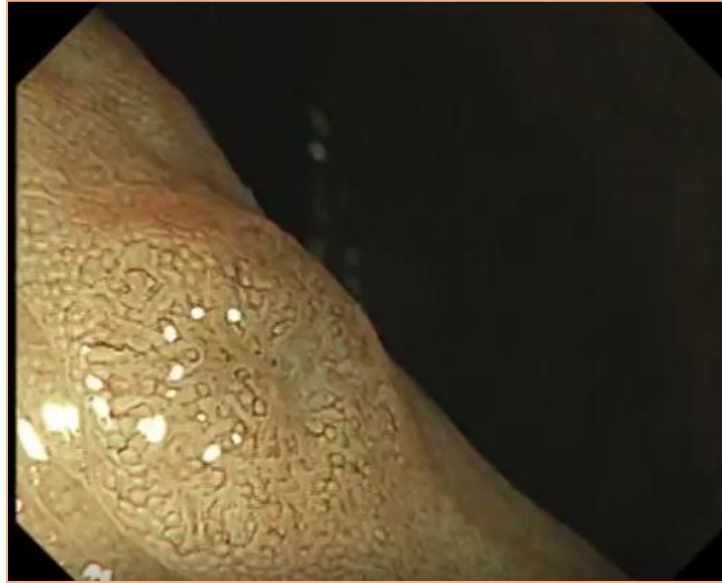
The JNET classification, Part 1/2

https://drive.google.com/file/d/1UDdyCqF_-4QwO_o9t5O28PD2KBVdjN4o/view?usp=sharing

JNET classification type 2A

Vascular pattern	Regular caliber Regular distribution meshed/spiral pattern
Surface pattern	Regular (tubular/branched/papillary)
Most likely diagnosis	Low grade intramucosal dysplasia (LGD)
Endoscopic image	

JNET classification type 2A



Central depression (**Valley sign**)

No clear vessel in central depression

Not to be confused with type 2B or type 3

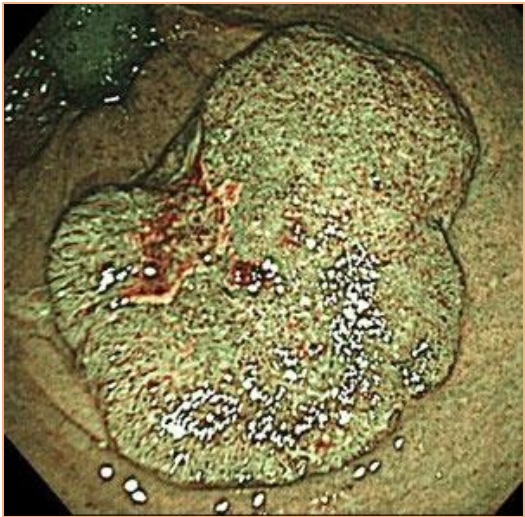
The JNET classification, Part 1/2

https://drive.google.com/file/d/1UDdyCqF_-4QwO_o9t5O28PD2KBVdjN4o/view?usp=sharing

JNET classification type 2B

Vascular pattern	Variable caliber Irregular distribution
Surface pattern	Irregular or obscure
Most likely diagnosis	High-grade intra-mucosal dysplasia (HGD) Superficial sub-mucosal invasion (SM-s)
Endoscopic image	

JNET classification type 3

Vascular pattern	Loose vessel areas Interruption of thick vessels
Surface pattern	Amorphous area
Most likely diagnosis	Deep submucosal invasion (SM-d)
Endoscopic image	 An endoscopic image showing a large, polypoid lesion on the colonic mucosa. The lesion has a lobulated, nodular surface with a mix of green and reddish-brown colors, indicating a JNET type 3 pattern. The surrounding mucosa appears normal.

Validation study of JNET classification

retrospective study – 199 cases – 3 expert observers

	Type 1	Type 2A	Type 2B	Type 3
Sensitivity	85.7 (57.2 – 98.2)	96.0 (91.0 – 98.7)	75.6 (59.7 – 87.6)	29.4 (10.3 – 56.0)
Specificity	99.5 (97.0 – 100)	81.9 (71.1 – 90.0)	90.5 (84.8 – 94.6)	100 (98.0 – 100)
PPV	92.3 (64.0 – 99.8)	90.3 (84.1 – 94.8)	67.3 (52.0 – 80.5)	100 (47.8 – 100)
NPV	98.9 (64.0 – 99.8)	92.1 (82.7 – 97.4)	93.4 (88.3 – 96.8)	93.8 (89.4 – 96.8)
Accuracy	98.5 (95.7 – 99.7)	90.9 (86.1 – 94.6)	87.4 (82.0 – 91.7)	94.0 (89.7 – 96.8)

In case of disagreement: discussion until a consensus was reached

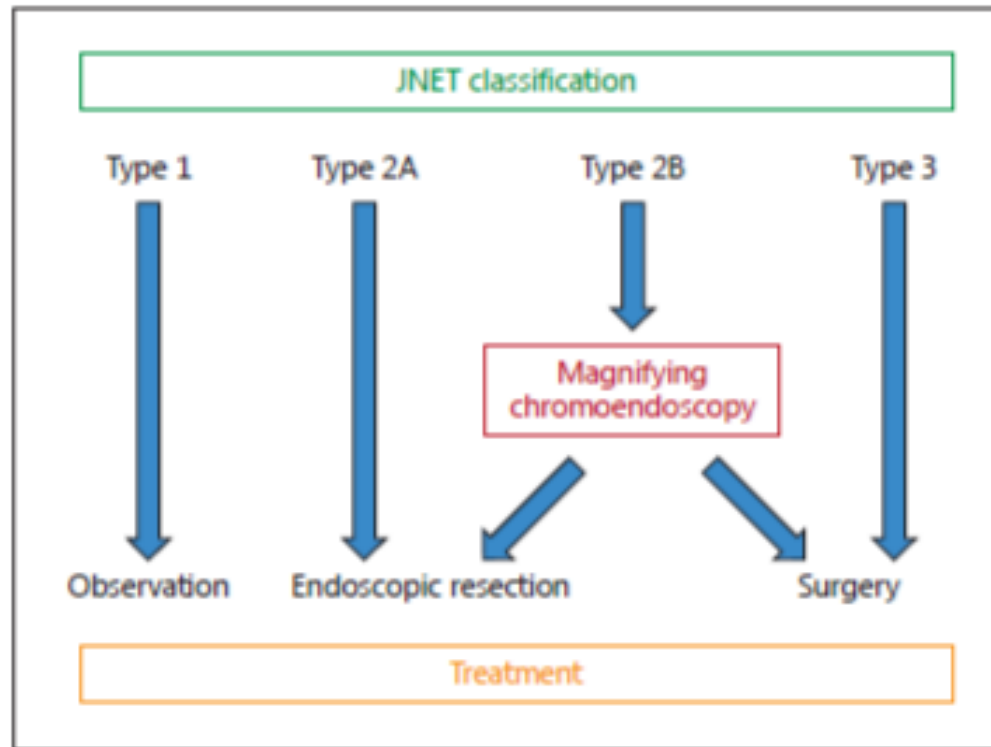
NPV: negative predictive value – PPV: positive predictive value
Komeda Y et al. Oncology 2017;93(suppl 1):49–54.

Correlation endoscopic JNET classification/histology

- **Type 1** Correlates strongly w hyperplastic/sessile serrated polyps
- **Type 2A** Correlates strongly w low grade dysplasia (LGD)
- **Type 2B** Ranging from LGD to submucosal deep invasion (SM-d)
- **Type 3** Correlates strongly w submucosal deep invasion (SM-d)

**Subsequent magnifying chromoendoscopy strongly
recommended for type 2B**

Therapeutic strategy based on JNET classification and magnifying chromoendoscopy



Future perspective

- It is expected that image enhanced endoscopy for colorectal polyps using magnifying endoscopy will spread worldwide
- Validation studies conducted around the world are awaited to confirm the diagnostic accuracy of this classification
- JNET classification may be updated with the arrival of new or additional NBI findings

Endoscopic Quiz 1



What is the type of JNET classification?

What to do?

Endoscopic Quiz 1



Vascular pattern: regular caliber – regular distribution

Surface pattern: regular

JNET classification: type 2A

What to do? endoscopic resection

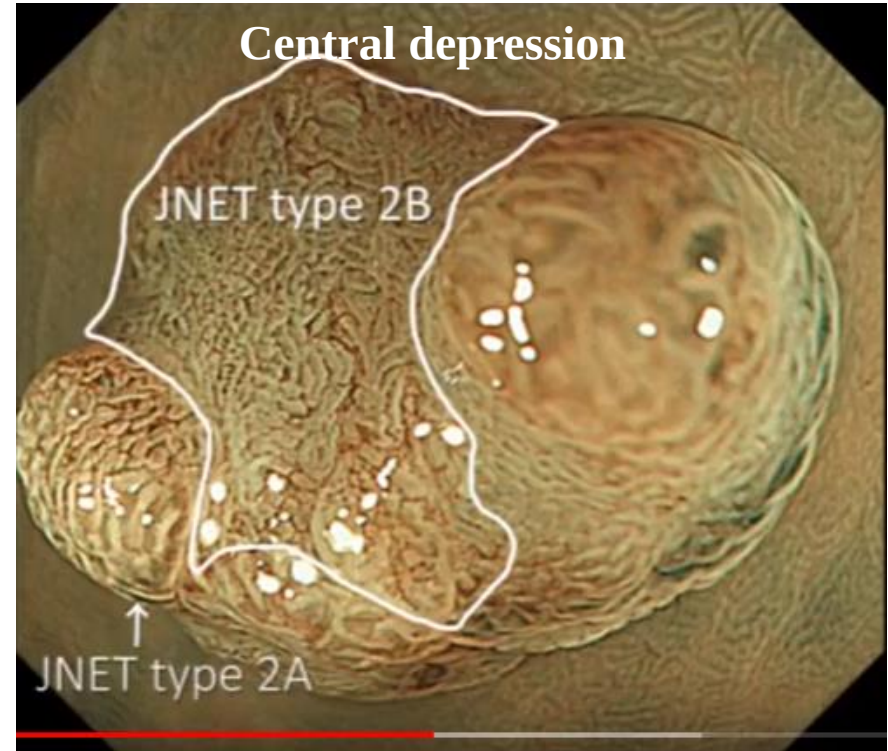
Endoscopic Quiz 2



What is the type of JNET classification?

What to do?

Endoscopic Quiz 2



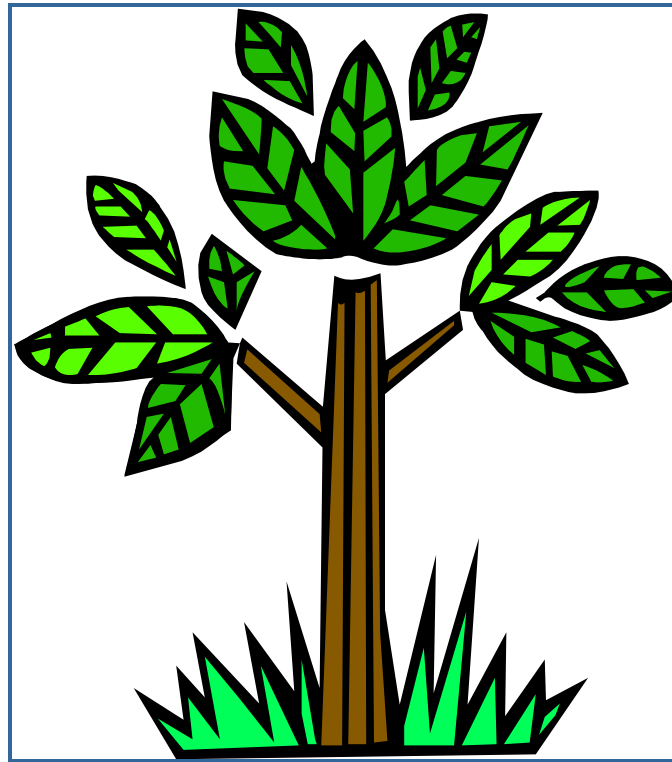
Vascular pattern: variable caliber – irregular distribution

Surface pattern: irregular

JNET classification: type 2B

What to do? magnifying chromoendoscopy

Thank You

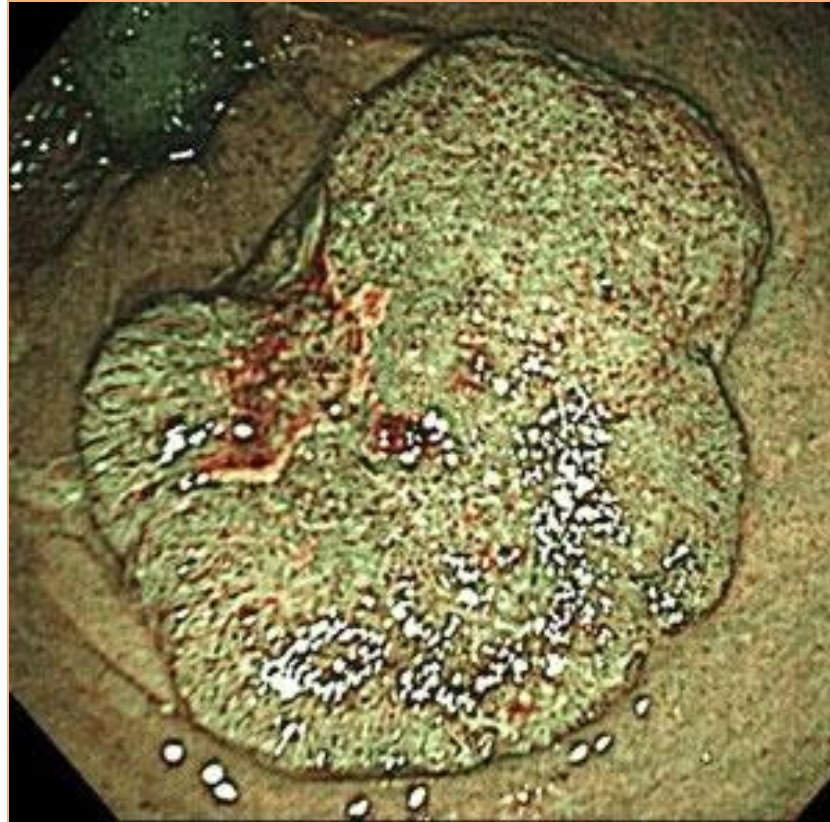


Interpretation of different values of kappa

kappa from Greek letter κ

Value of kappa	Strength of agreement
0 – 0.20	poor
0.21 – 0.40	fair
0.41 – 0.60	moderate
0.61 – 0.80	good
0.81 – 1.00	excellent
kappa score of 0.6 indicates good agreement	

Endoscopic Quiz 3



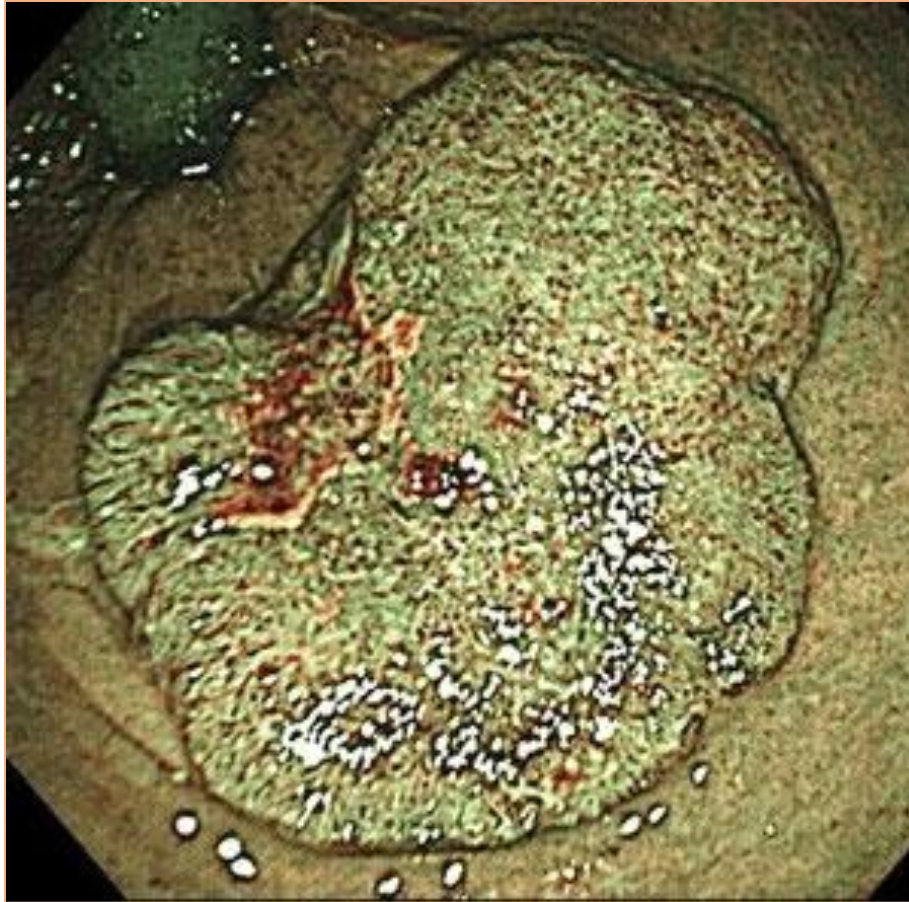
Vascular pattern: loose vessel areas - interruption of thick vessels

Surface pattern: amorphous area

JNET classification: type 3

What to do? surgical resection

Endoscopic Quiz 3



What is the type of JNET classification?

What to do?

Inter- & intraobserver agreement

retrospective study – 199 cases – 3 expert observers

- **Inter-observer agreement:**

Vessel pattern κ 0.52 (**moderate**)

Surface pattern κ 0.52 (**moderate**)

- **Intra-observer agreement:**

Calculated 6 months later by a single observer

Vessel pattern κ 0.87 (**excellent**)

Surface pattern κ 0.88 (**excellent**)

Validation study of JNET classification

retrospective study – 199 cases – 3 expert observers

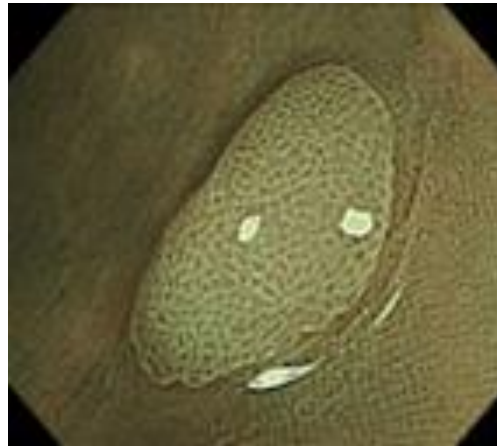
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Accuracy	98.5 (95.7 – 99.7)	90.9 (86.1 – 94.6)	87.4 (82.0 – 91.7)	94.0 (89.7 – 96.8)

JNET classification useful for diagnosis of:
Hyperplastic polyp/sessile serrated polyps (type 1)
Low grade dysplasia (type 2A)
Submucosal deep lesions (type 3)

NPV: negative predictive value – PPV: positive predictive value
Komeda Y et al. Oncology 2017;93(suppl 1):49–54

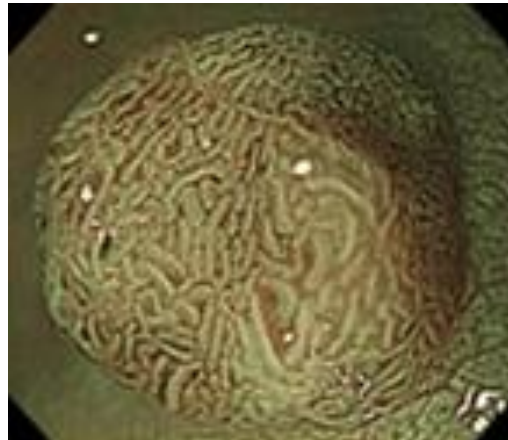
JNET classification type 1

- **Vascular pattern** Invisible
- **Surface pattern** Regular dark or white spots
Similar to surrounding normal mucosa
- **Most likely diagnosis** Hyperplastic polyp/Sessile serrated polyp
- **Endoscopic image**



JNET classification type 2A

- **Vascular pattern**
 - Regular caliber
 - Regular distribution
 - meshed/spiral pattern
- **Surface pattern**
 - Regular (tubular/branched/papillary)
- **Most likely diagnosis**
 - Low grade intramucosal neoplasia
- **Endoscopic image**



JNET classification type 2B

- **Vascular pattern**
 - Variable caliber
 - Irregular distribution
- **Surface pattern**
 - Irregular or obscure
- **Most likely diagnosis**
 - High-grade intramucosal neoplasia
 - Superficial submucosal invasive cancer
- **Endoscopic image**



JNET classification type 3

- **Vascular pattern** Loose vessel areas
Interruption of thick vessels
- **Surface pattern** Amorphous area
- **Most likely diagnosis** Deep submucosal invasive cancer
- **Endoscopic image**

