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2016
ANNUAL MEETING

March 12-18 Seattle, Washington

 **USCAP**
Creating a Better Pathologist

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Dr. Arnold declares she has no conflict(s) of interest to disclose.



What is that Weird Foreign Material in that GI Specimen?

Christina A. Arnold, MD

*Rodger C. Haggitt Gastrointestinal Pathology Society Forum
United States and Canadian Academy of Pathologists
Seattle, Washington, March 12, 2016*

Respondents:

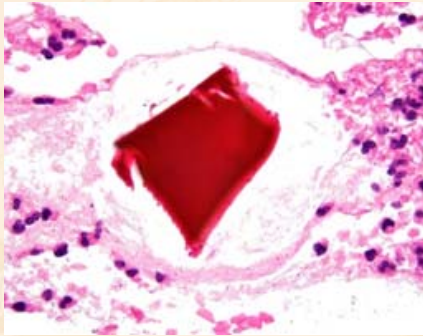
1. GIPS=88; Twitter=11
2. Academics= 63 (64%)
3. Reliable access to EMR = 78 (79%)
4. Resins never reported on the requisition= 75 (76%)
5. *“Clinicians are clueless”* = 1

Why are Resins Important?

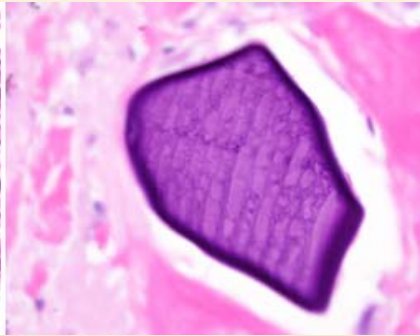
1. Recent developments
2. Diagnostic accuracy
3. Potentially save lives
4. Resins are important clues to other diagnoses

Grade = D: *Room to Grow*

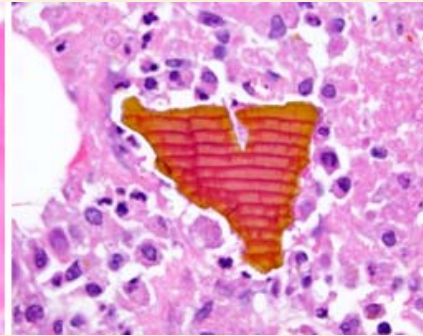
BAS



Kayexalate

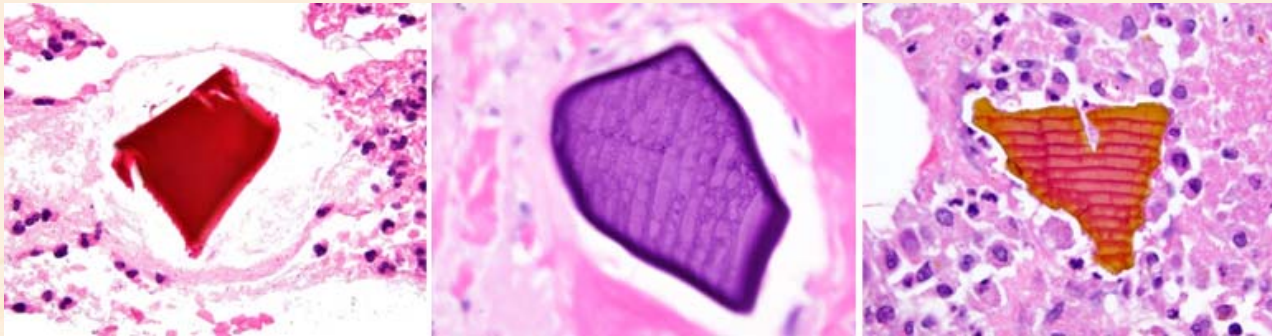


Sevelamer



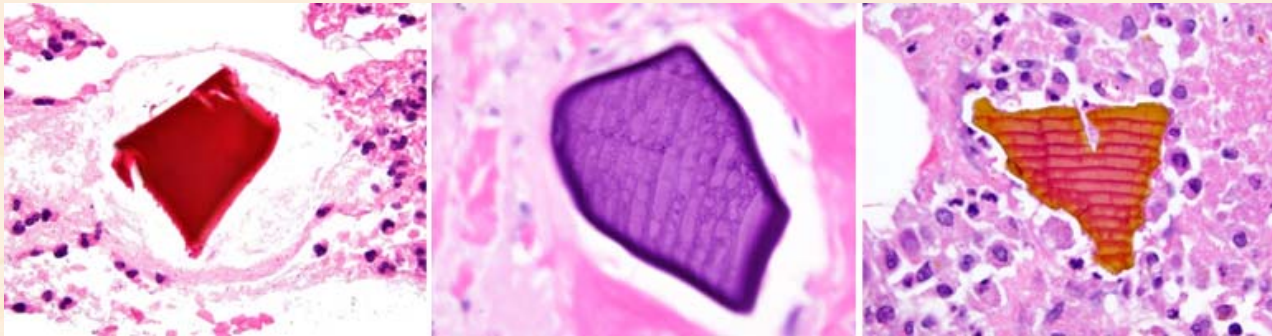
- Did not recognize= 12 (12%)
- Incorrect= 12 (12%)
- Correct= 68 (69%)

Resins at a Glance



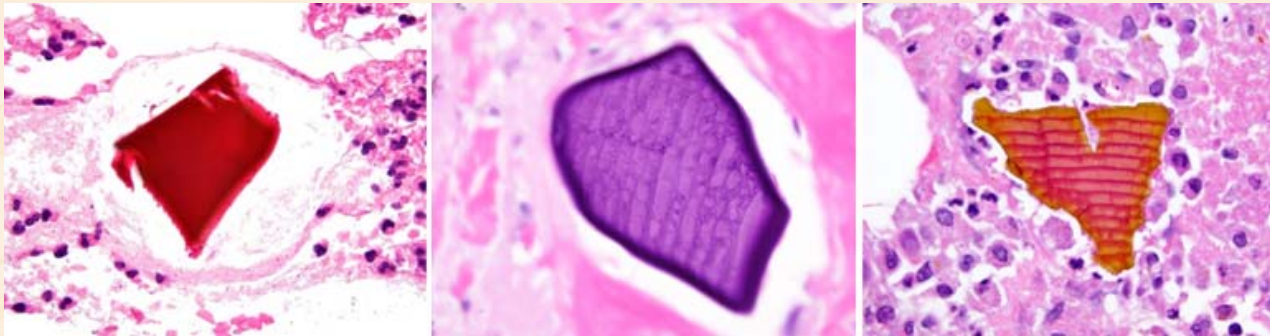
Key Features	Bile Acid Sequestrants (BAS)
Trademark	Many
Target ion	Bile acids
Clinical history	Diarrhea
Mucosal injury	No
Fish-scales	None
H&E	Bright orange to black
AFB	Dull yellow

Resins at a Glance



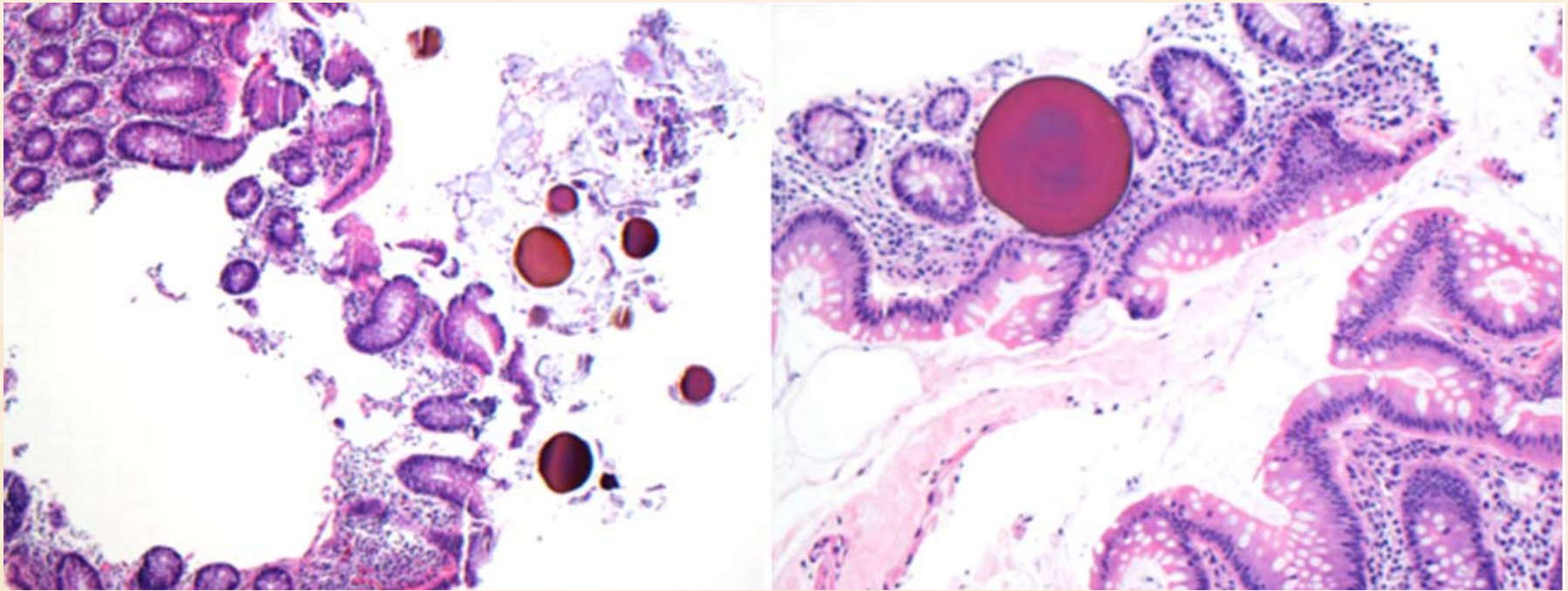
Key Features	Bile Acid Sequestrants (BAS)	Sodium Polystyrene Sulfonate
Trademark	Many	Kayexalate®
Target ion	Bile acids	Potassium
Clinical history	Diarrhea	Chronic renal failure
Mucosal injury	No	Yes
Fish-scales	None	Yes
H&E	Bright orange to black	Purple
AFB	Dull yellow	Black

Resins at a Glance



Key Features	Bile Acid Sequestrants (BAS)	Sodium Polystyrene Sulfonate	Sevelamer
Trademark	Many	Kayexalate®	Renagel® Renvela®
Target ion	Bile acids	Potassium	Phosphate
Clinical history	Diarrhea	Chronic renal failure	Chronic renal failure
Mucosal injury	No	Yes	Possible
Fish-scales	None	Yes	Yes
H&E	Bright orange to black	Purple	2-toned pink/yellow
AFB	Dull yellow	Black	Magenta

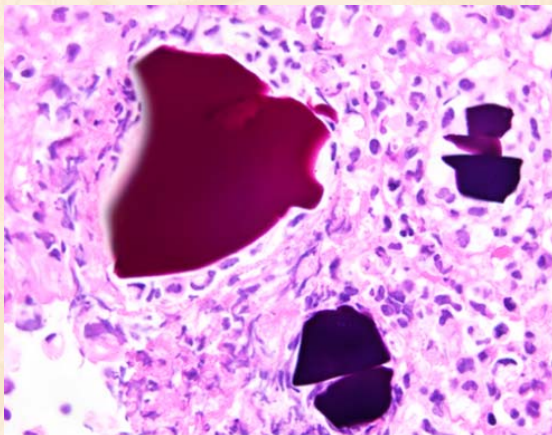
Dirty Little Secret #1: *BAS can be Round*



Gonzalez RS, Schwartz DA, Shi C. Colestipol granules in the colon: macroscopic and microscopic findings. *Histopathology*. 2015 Jul;67(1):141-2.

Dirty Little Secret #2: *Beware the Many, Many, Many BAS*

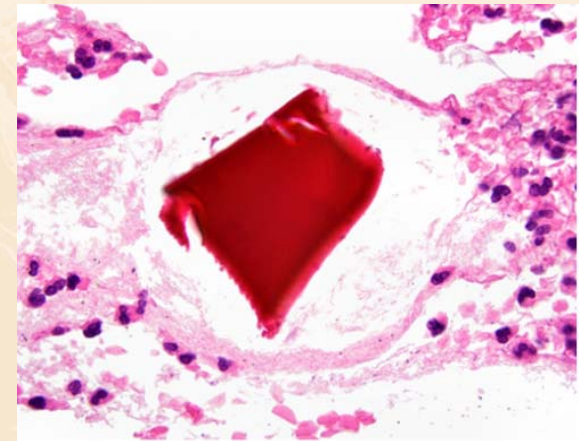
Colesevelam
(Welchol®)



Colestipol
(Colestid®)



Cholestyramine
(LoCholest®
Prevalite®
Questran®)



Dirty Little Secret #3: *Sevelamer-Colitis can Present as a Pseudotumor*



Okwara C, Choi C, Park JY. Sevelamer-Induced Colitis Presenting as a Pseudotumor. Clin Gastroenterol Hepatol. 2015 Jul;13(7):A39-40.



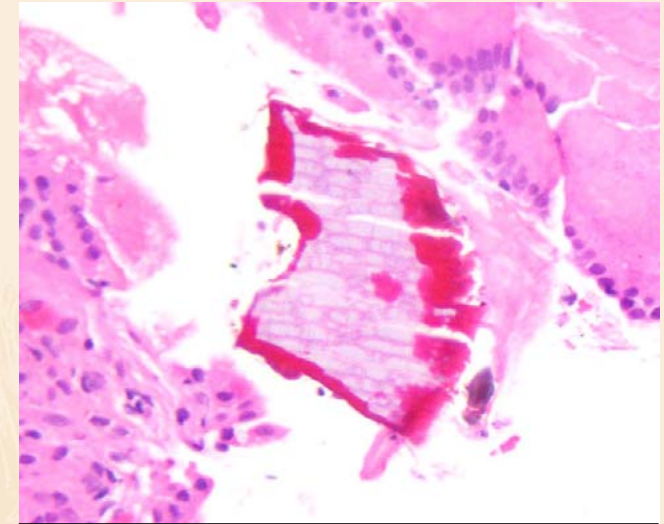
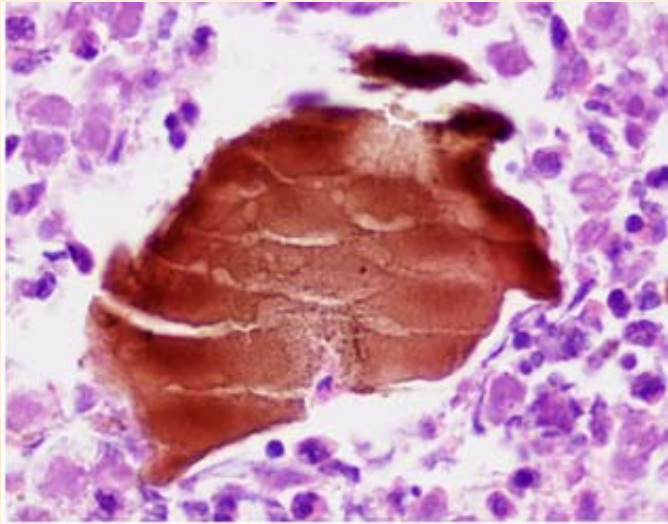
Dirty Little Secret #4:
Resin Colors are (Sometimes) Over-Rated

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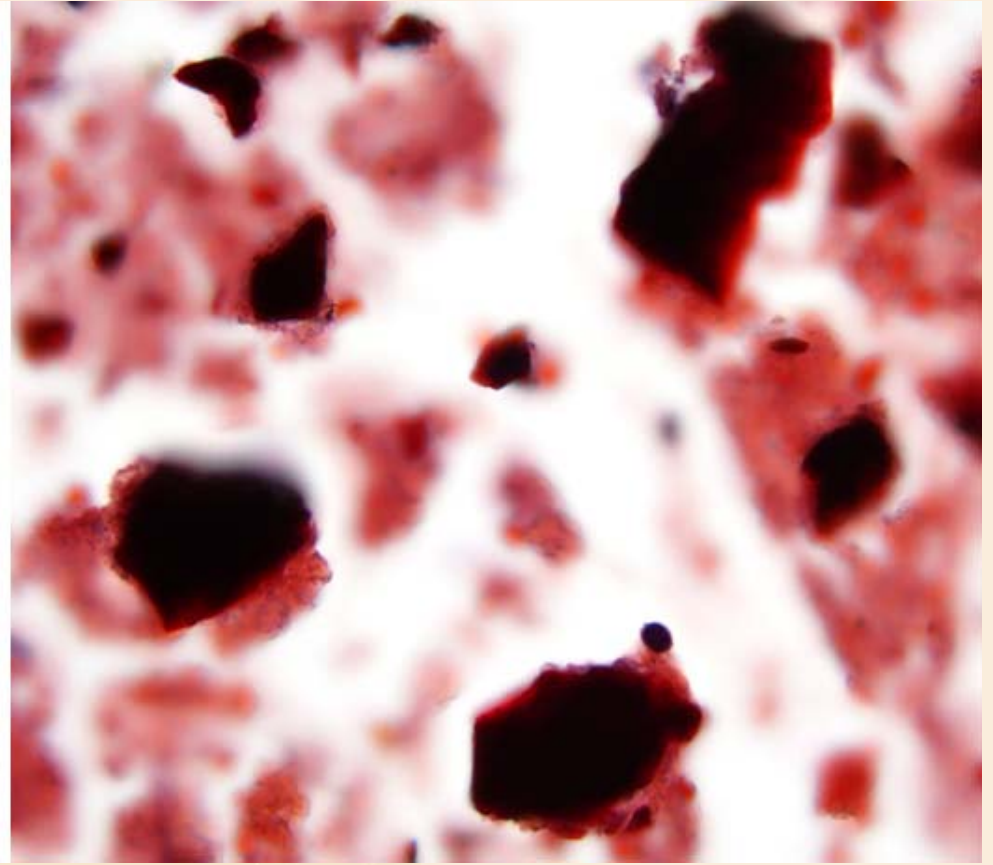
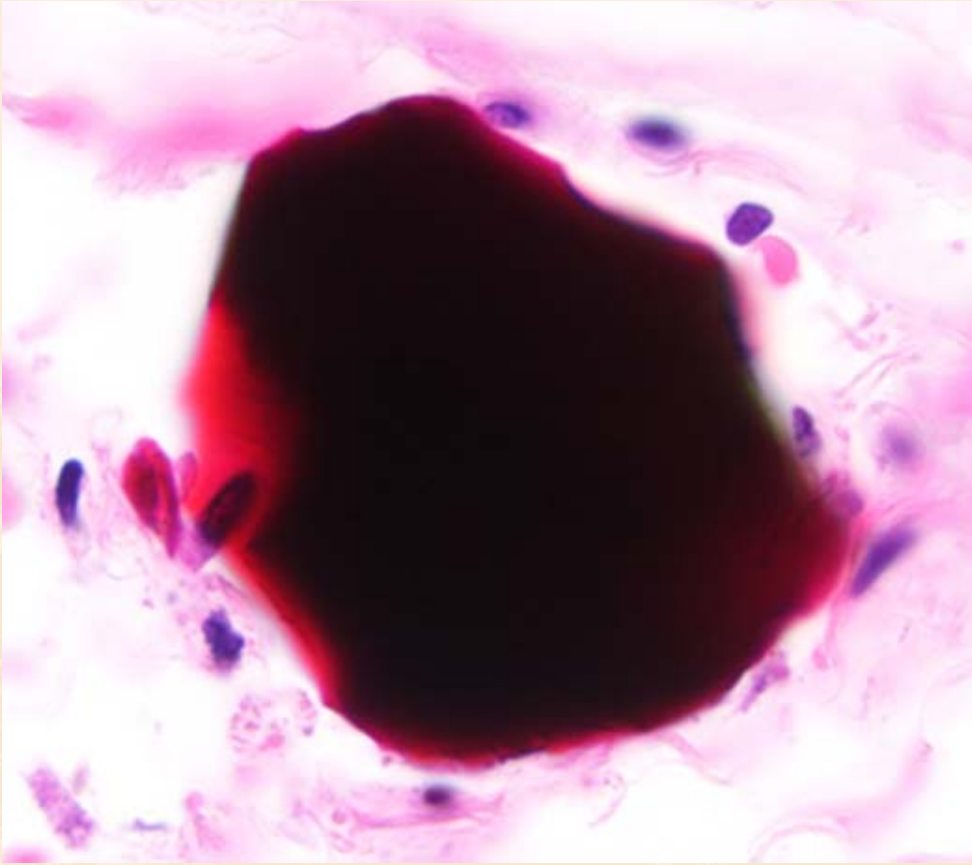
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Sevelamer can Appear Brown, Red, or Purple



Courtesy of Dr. Stephen M. Lagana

BAS can Appear Black



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Dirty Little Secret #5:
Fish-Scales are (Sometimes) Over-Rated

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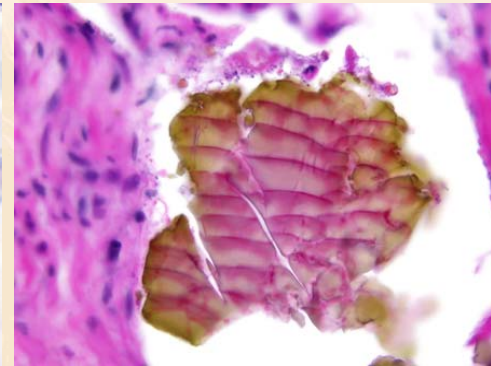
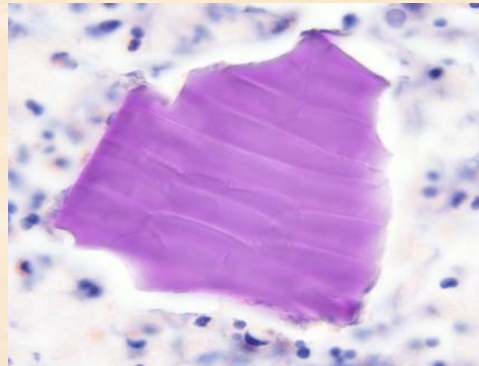
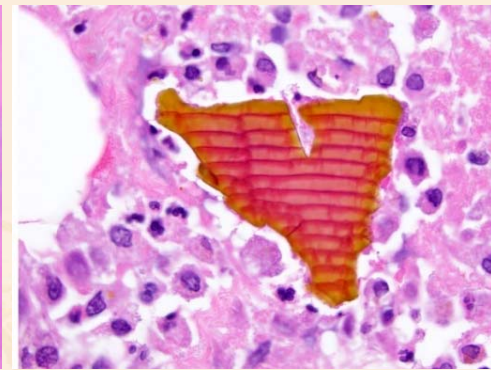
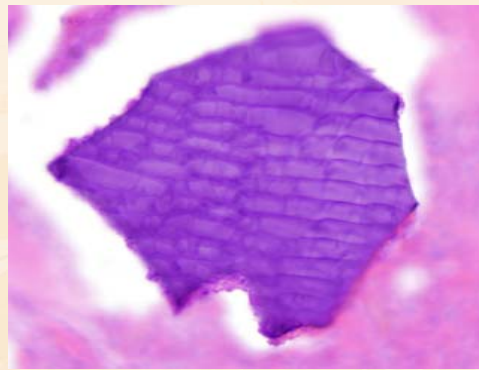
Fish-Scales can be Curvilinear or Straight

Narrow
Fish-Scales

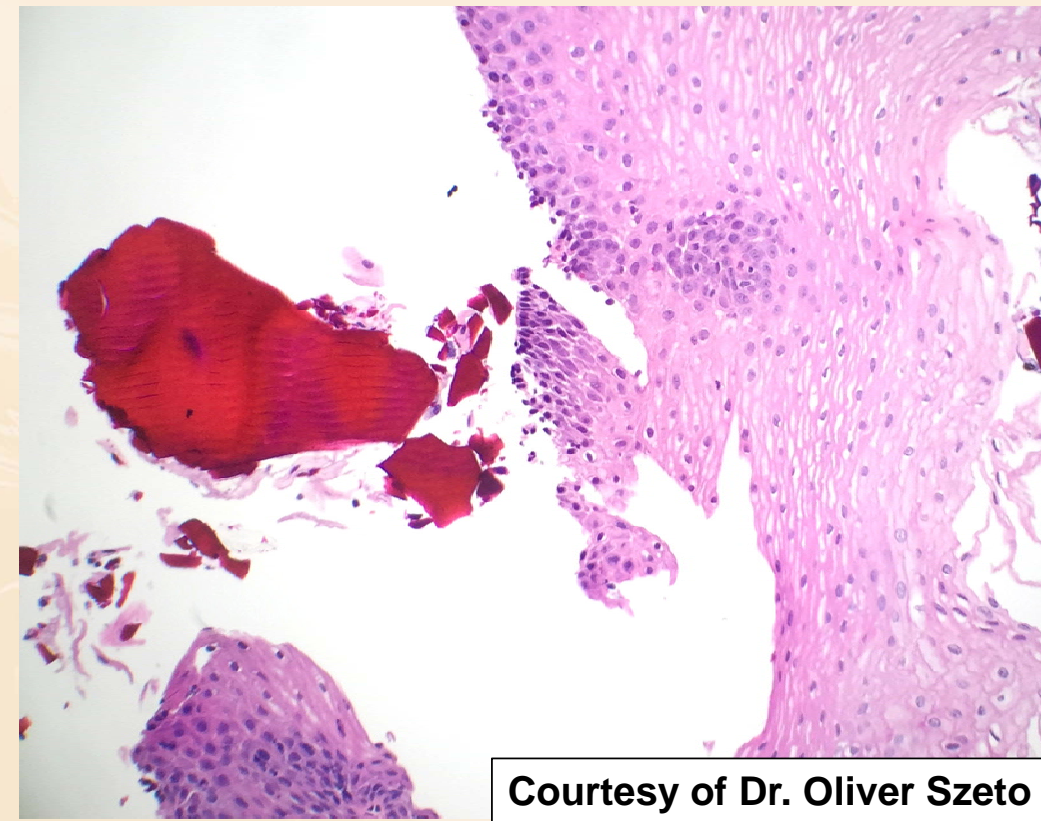
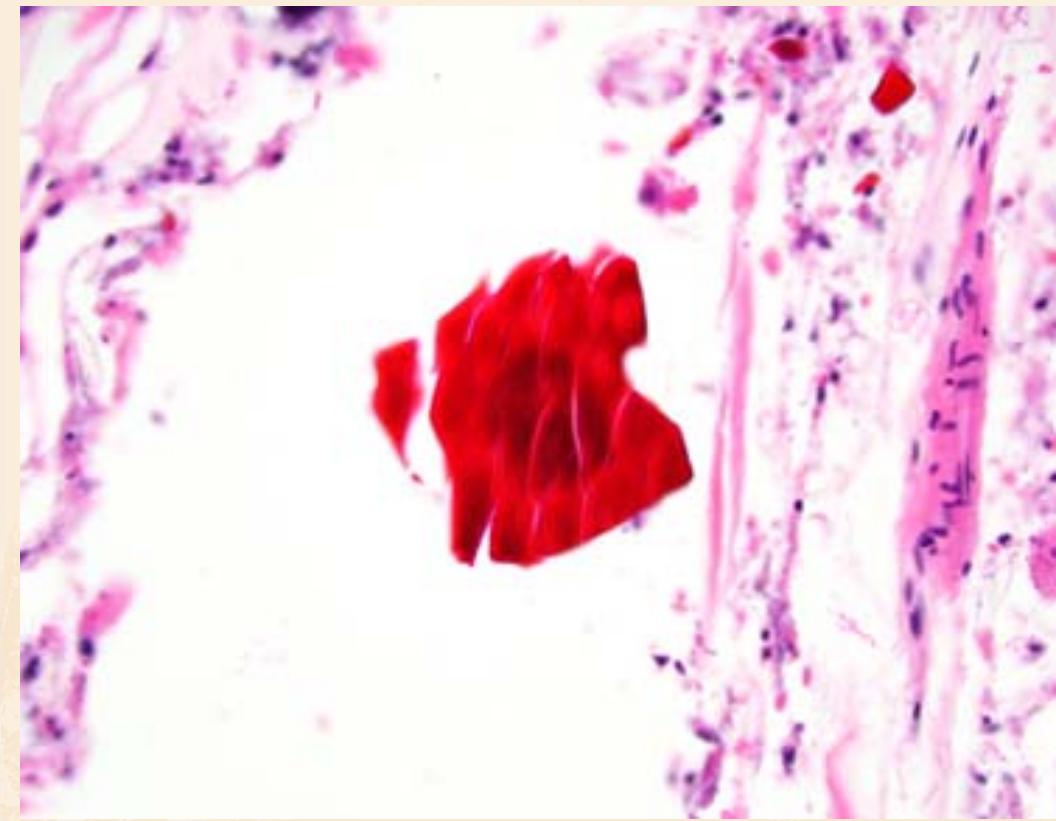
Curvilinear
Fish-Scales

Kayexalate

Sevelamer



BAS can have Fish-Scales



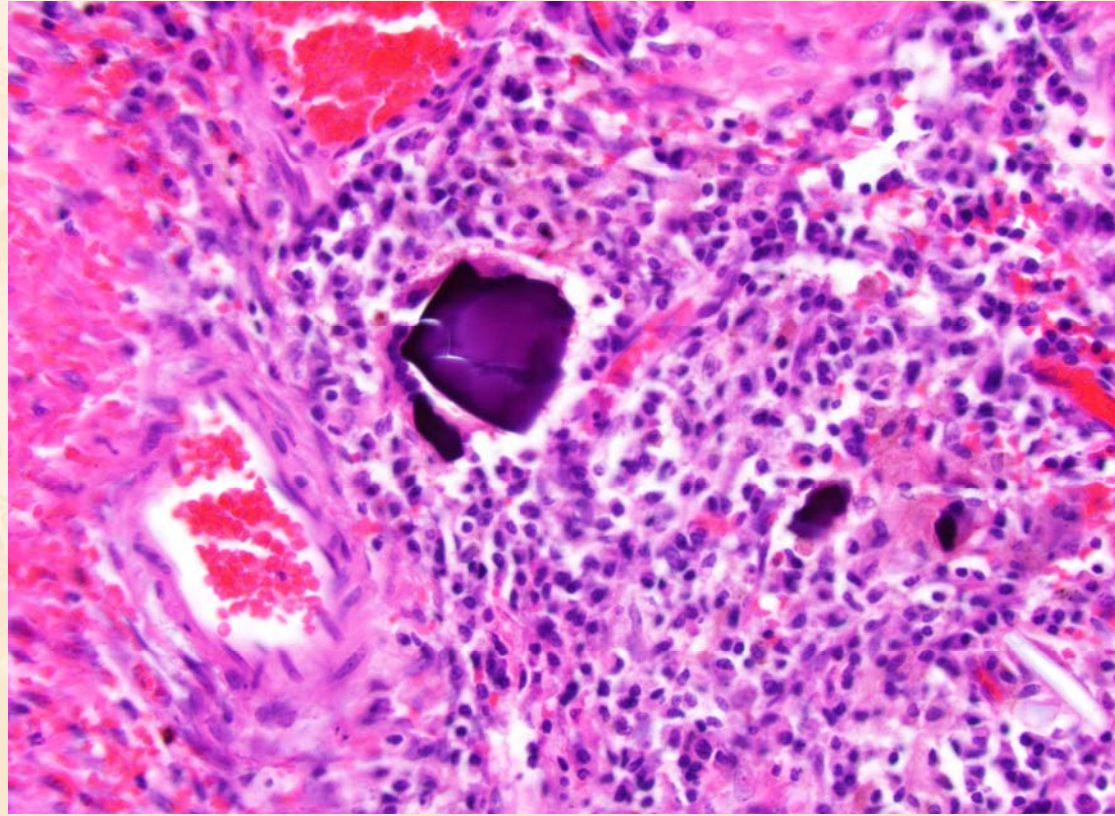
Courtesy of Dr. Oliver Szeto

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Kayexalate can lack Fish-Scales

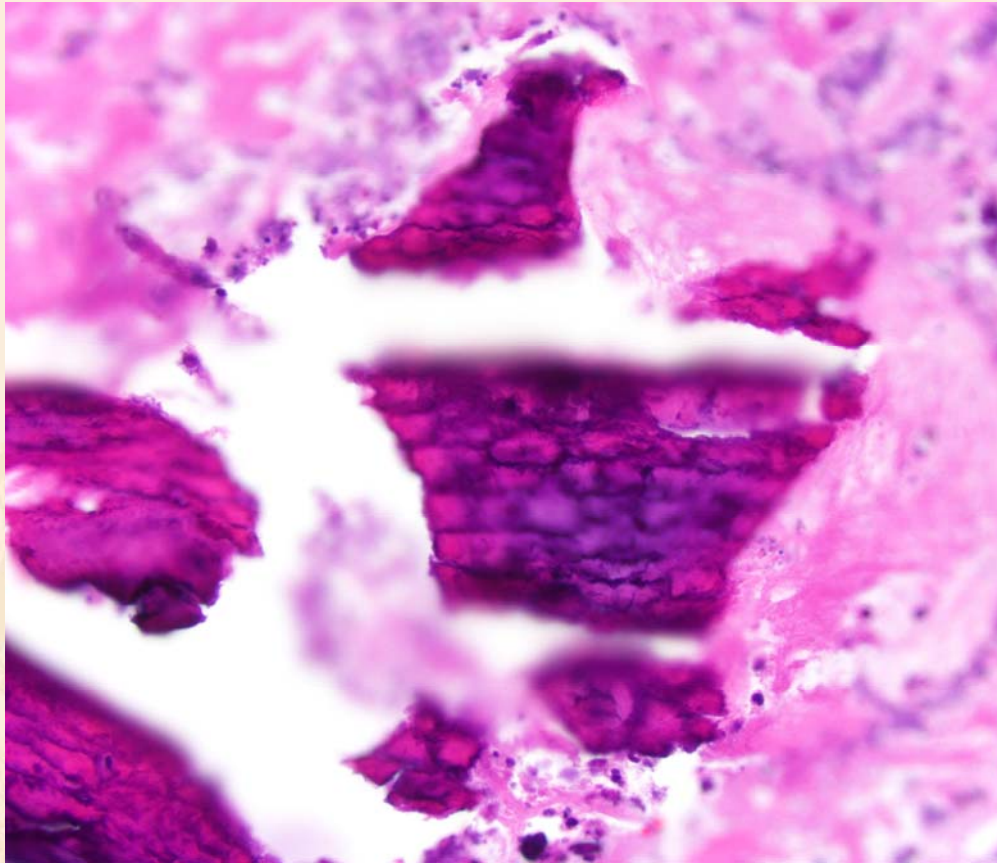


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Dystrophic Calcifications



Calculi

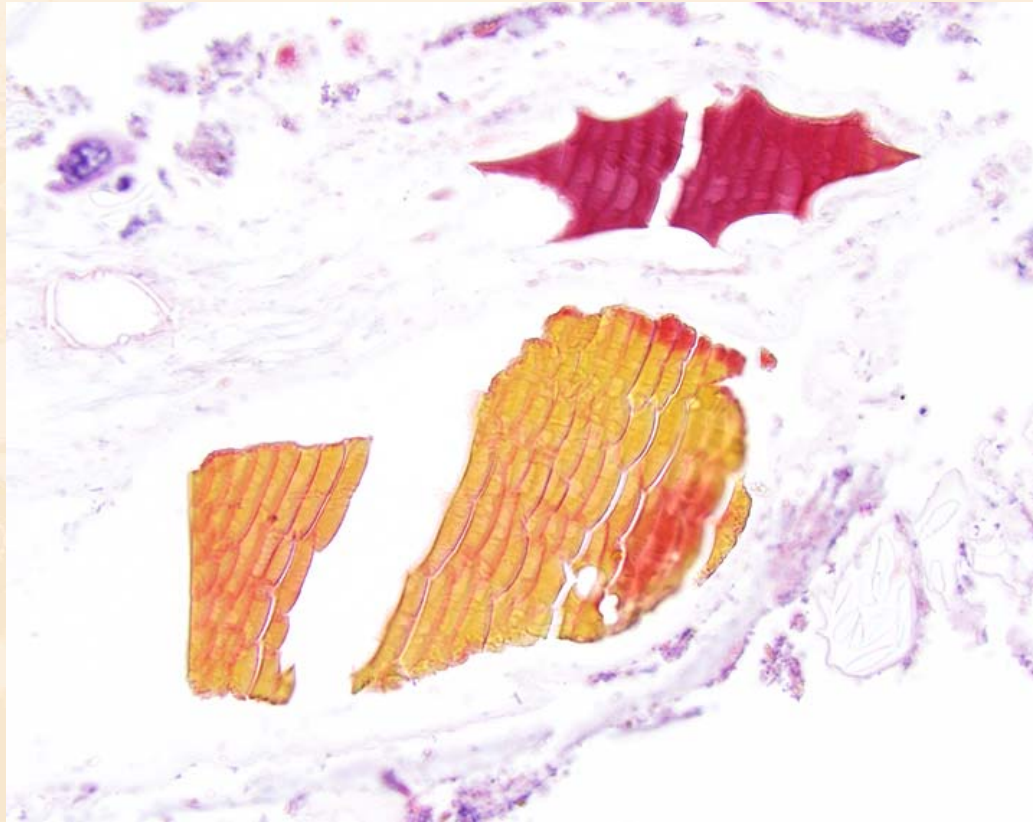


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???

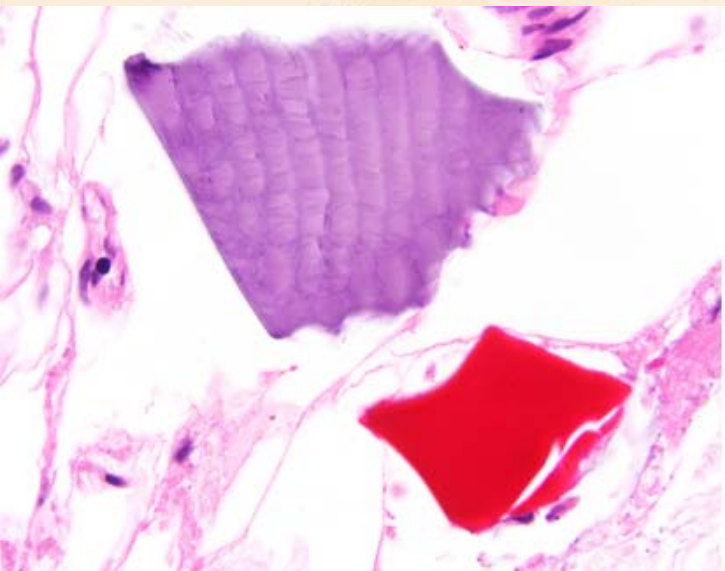


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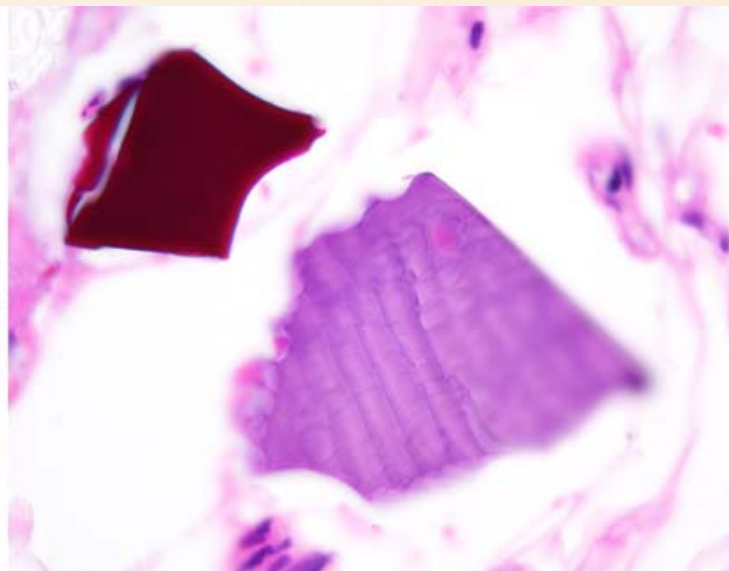
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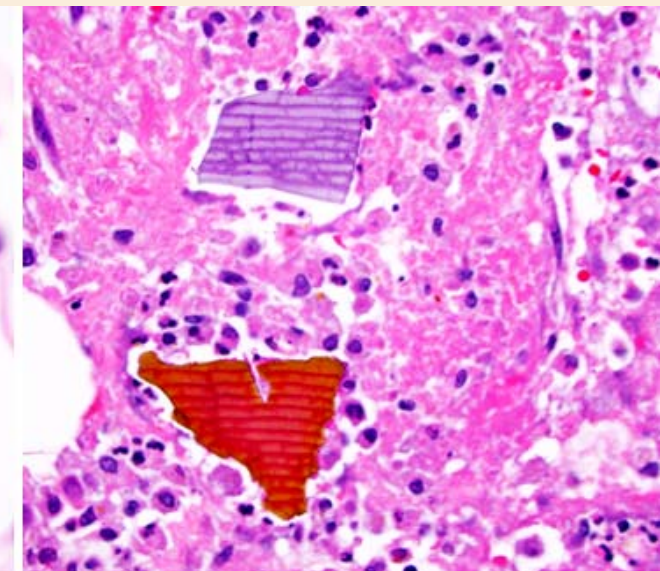
Dirty Little Secret #6: *“Doubles” Happen*



Kayexalate & BAS

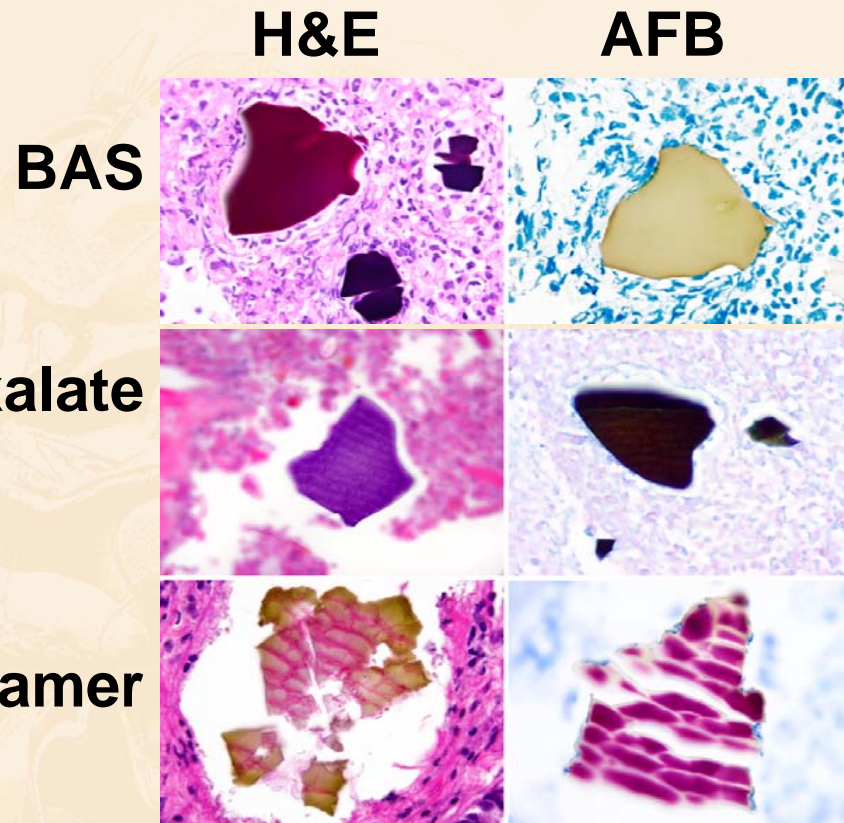


Kayexalate & BAS



Kayexalate & Sevelamer

Dirty Little Secret #7: *AFB Most Useful Special Stain*



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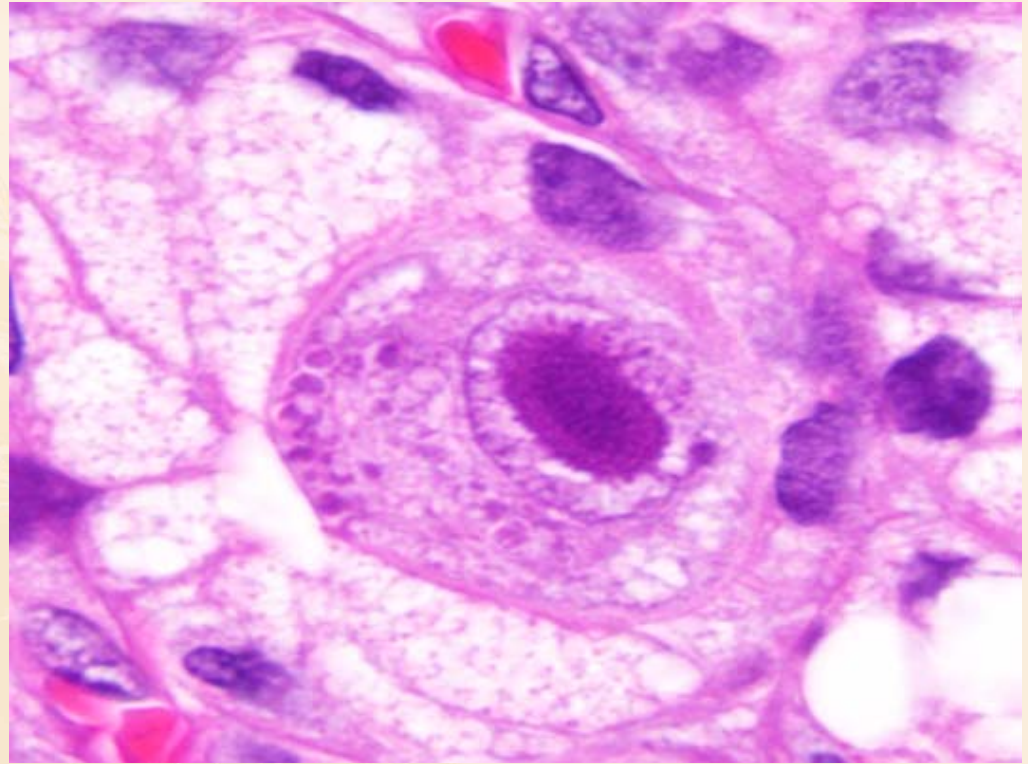
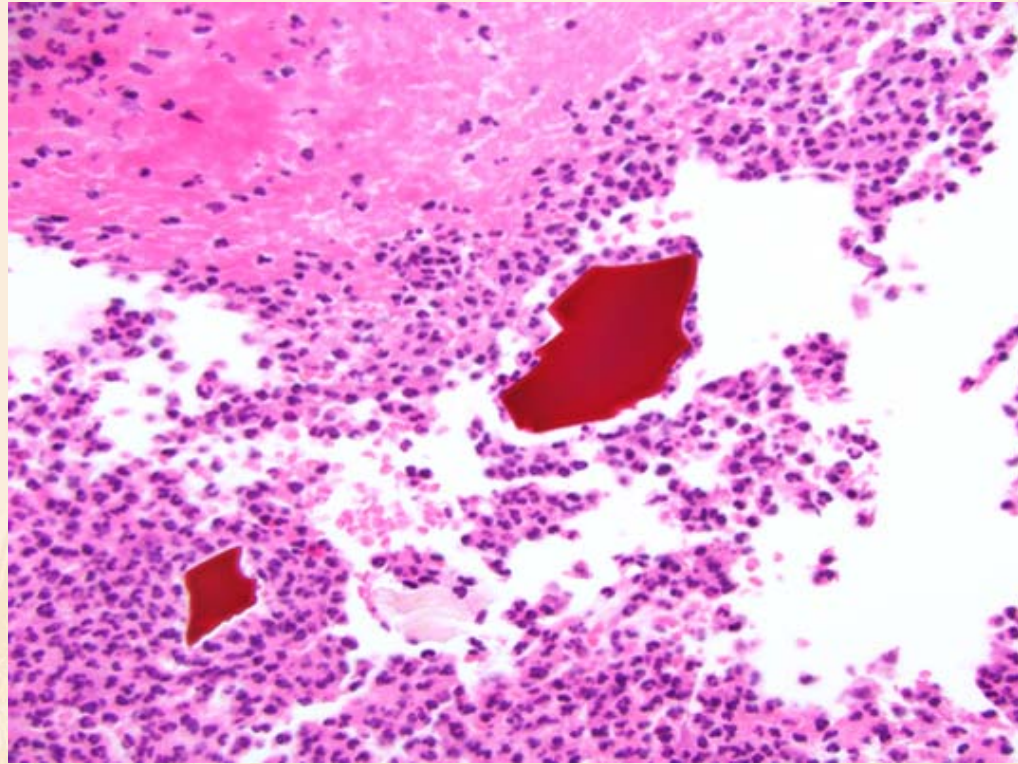
Dirty Little Secret #8:
Resins are Important Clues to other Diagnoses

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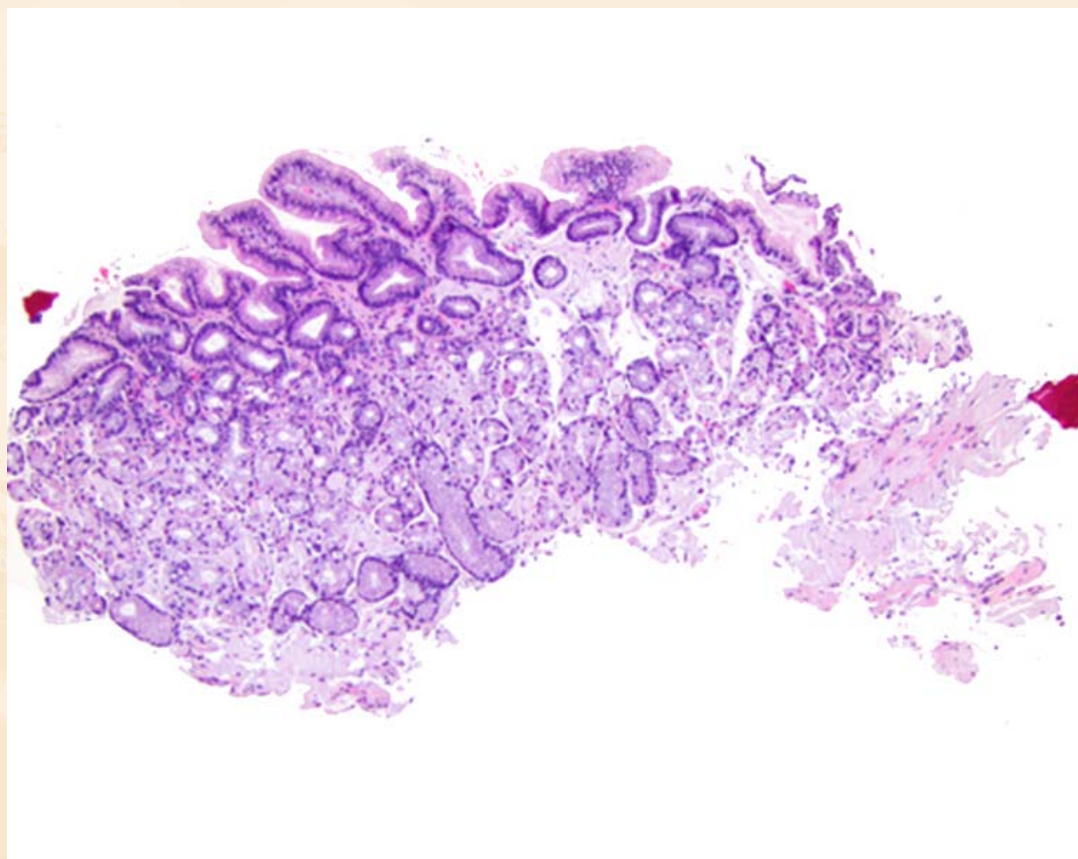
BAS can be Clues to CMV



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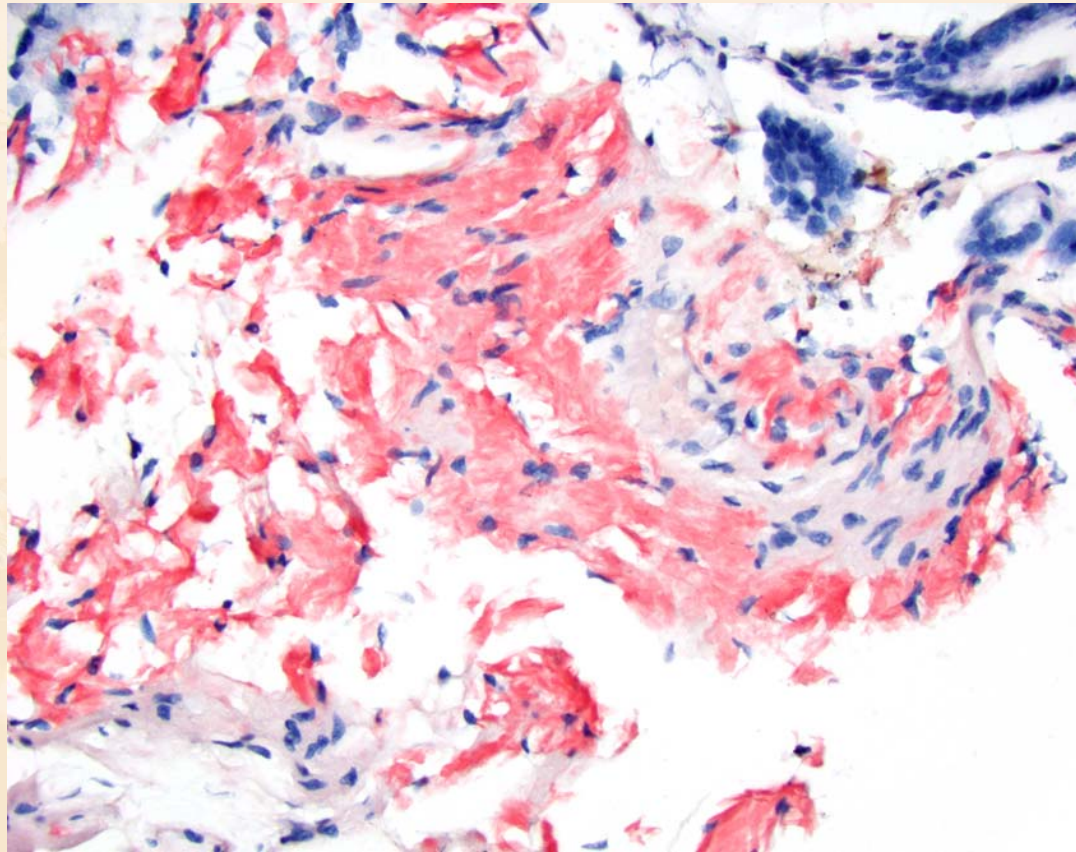


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Kayexalate & Sevelamer can be Clues to Amyloid

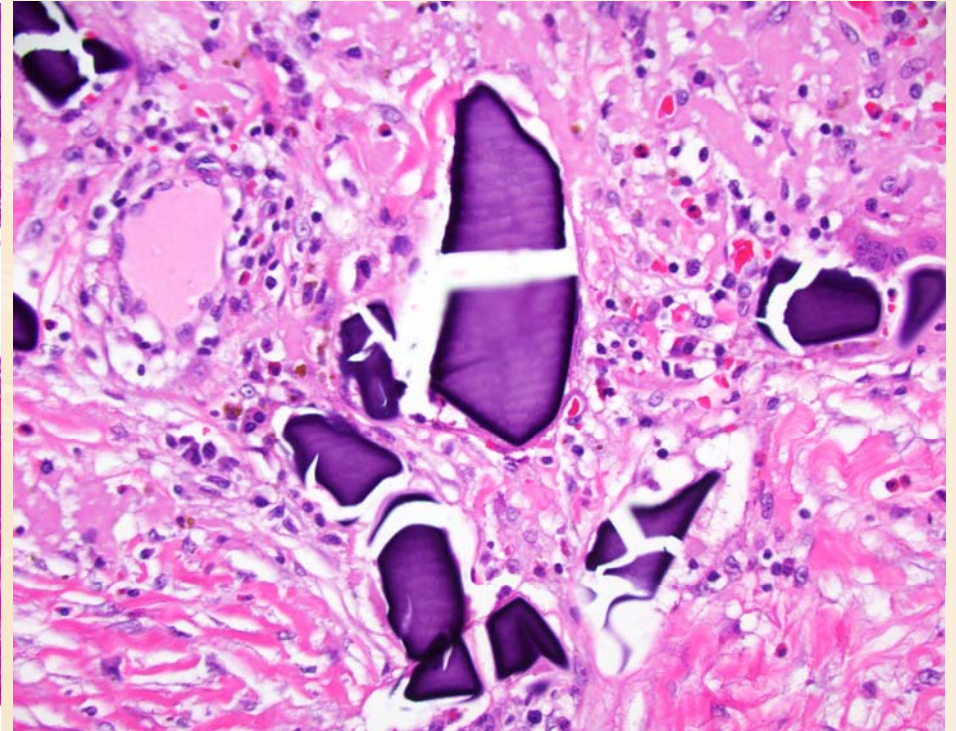
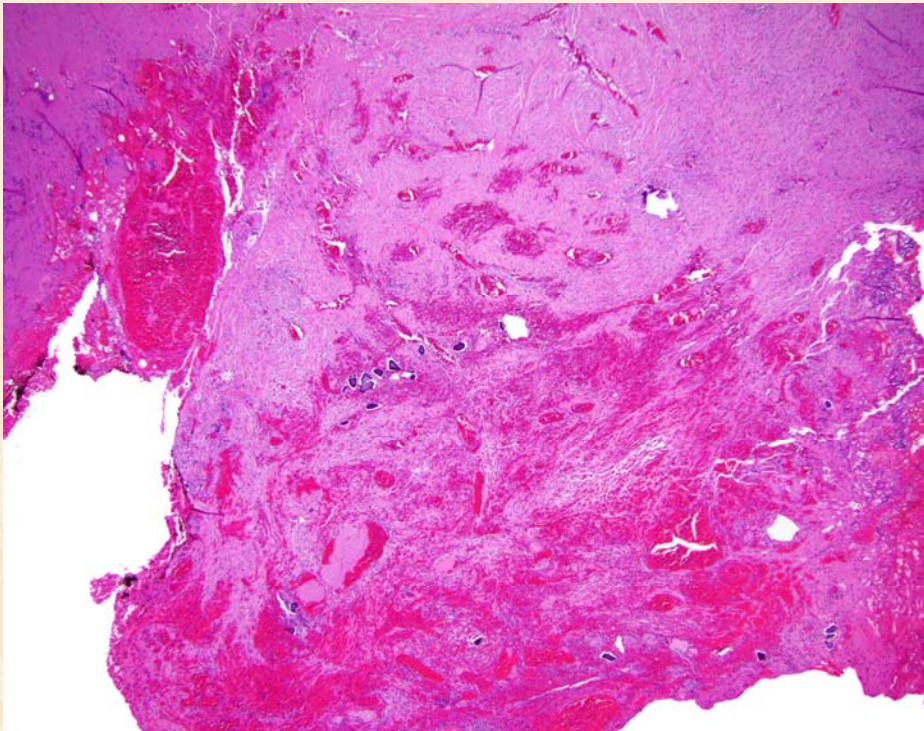


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Uncharted Territory: *Kayexalate in Unusual Locations*



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General Reporting Approaches:

- **Report when present**
- **Emergently contact the clinician:**
 - Kayexalate and Sevelamer with tissue damage
- **Specific top-line:**
 - Classic morphology, +/- clinical confirmation
- **Descriptive top-line:**
 - Non-classic morphology without clinical confirmation
 - Strange locations

Reporting Examples: *Specific Report*

-“Sevelamer resins identified, See note”

Note: In the small series available, Sevelamer was sometimes associated with mucosal injury. (Optional: Dr. Arnold verbally discussed these findings with Dr. X on XX at XXPM.)

Reference:

Swanson BJ, Limketkai BN, Liu TC, Montgomery E, Nazari K, Park JY, Santangelo WC, Torbenson MS, Voltaggio L, Yearsley MM, Arnold CA. Sevelamer crystals in the gastrointestinal tract (GIT): a new entity associated with mucosal injury. *Am J Surg Pathol.* 2013 Nov;37(11):1686-93.

Reporting Examples: *Descriptive Report, I*

-“Eosinophilic crystals identified, See note”

Note: No clinical notes are available at time of slide review. Eosinophilic crystals are seen on H&E. These structures are yellow on AFB and are suggestive of Bile Acid Sequestrants (BAS: Colesevelam (Welchol), Colestipol (Colestid), Cholestyramine (LoCholest, Prevalite, Questran). In the small series available, BAS have no established role in causing mucosal damage.

Reference:

Arnold MA, Swanson BJ, Crowder CD, Frankel WL, Lam-Himlin D, Singhi AD, Stanich PP, Arnold CA. Colesevelam and colestipol: novel medication resins in the gastrointestinal tract. Am J Surg Pathol. 2014 Nov;38(11):1530-7.

Reporting Examples: *Descriptive Report, II*

-“Basophilic crystals identified within pancreatic pseudocyst, See note”

Note: Scattered basophilic crystals are seen, which are black on AFB and suggestive of Kayexalate. Kayexalate has been associated with tissue damage. Dr. Arnold verbally discussed these findings with Dr. X on XX at XXPM.

References:

1. Lillemoe KD, Romolo JL, Hamilton SR, Pennington LR, Burdick JF, Williams GM. Intestinal necrosis due to sodium polystyrene (Kayexalate) in sorbitol enemas: clinical and experimental support for the hypothesis. *Surgery*. 1987 Mar;101(3):267-72.
2. Abraham SC, Bhagavan BS, Lee LA, Rashid A, Wu TT. Upper gastrointestinal tract injury in patients receiving kayexalate (sodium polystyrene sulfonate) in sorbitol: clinical, endoscopic, and histopathologic findings. *Am J Surg Pathol*. 2001 May;25(5):637-44.
3. Rashid A, Hamilton SR. Necrosis of the gastrointestinal tract in uremic patients as a result of sodium polystyrene sulfonate (Kayexalate) in sorbitol: an underrecognized condition. *Am J Surg Pathol*. 1997 Jan;21(1):60-9.

Summary

- GIT Resins include BAS, Kayexalate, Sevelamer
- 24% had not seen or did not accurately identify resins
- Awareness of dirty little secrets and chart review most helpful
- AFB most helpful special stain
- We are at just at the tip of the iceberg!



What is that Weird Foreign Material in that GI Specimen?

Christina A. Arnold, MD

*Rodger C. Haggitt Gastrointestinal Pathology Society Forum
United States and Canadian Academy of Pathologists
Seattle, Washington, March 12, 2016*

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YOUR CELL PHONES**

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THANK YOU

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