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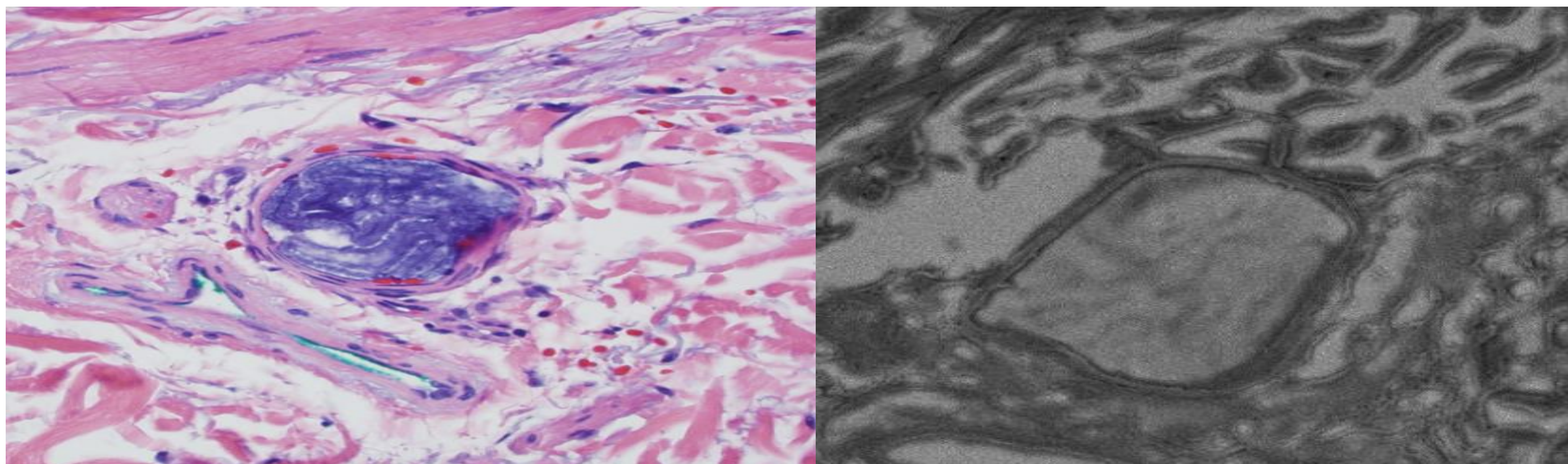
Objectives

- Hydrophilic polymer embolization (HPE) is a rare complication of endovascular procedures such as fenestrated endovascular aortic repair (FEVAR).
- Following cases of biopsy-confirmed HPE that mimicked spinal cord ischemia after FEVAR, we attempted to identify devices responsible for this phenomenon.

Methods

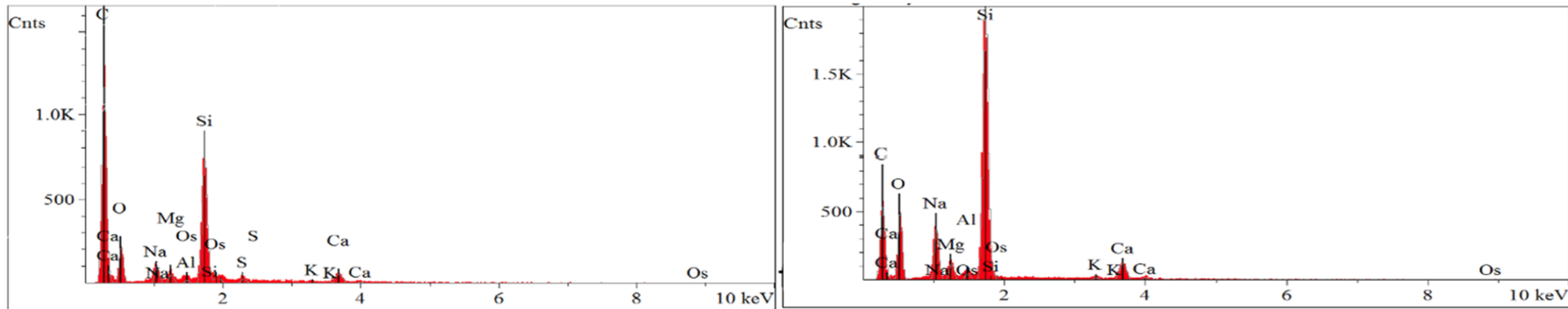
- Tissue blocks of a skin biopsy from a case of HPE showed embolized material within dermal capillaries (Fig 1)
- Scanning electron microscopy (SEM) with elemental composition analysis using energy dispersive x-ray (EDX) was performed on embolized material to characterize the ultrastructure and elemental content.
- 18 standard endovascular devices used during complex aortic repairs were amassed and representative samples from each were identically prepared for SEM-EDX analysis for comparison to the HPE case results.

Figure 1



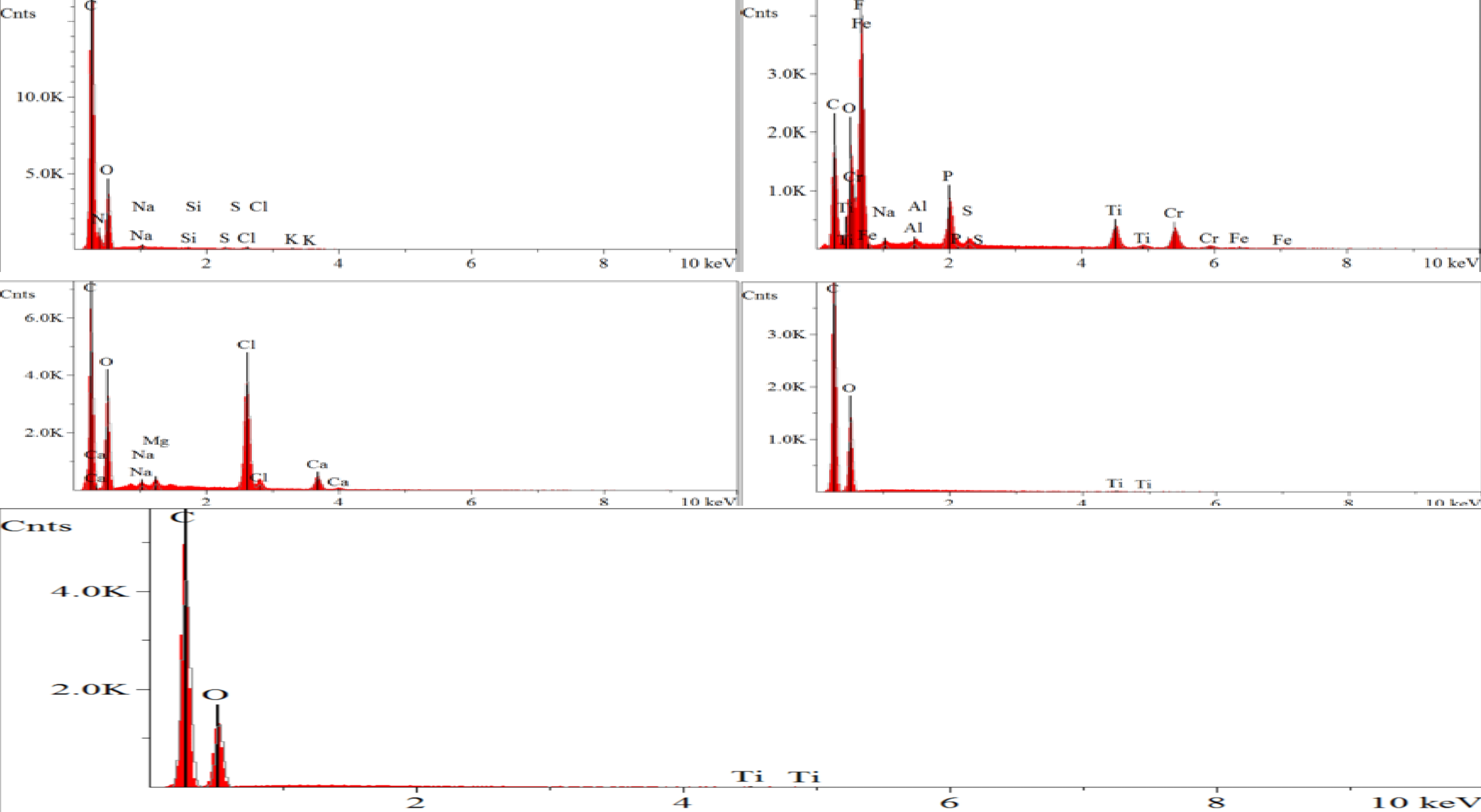
Dermal biopsy with H&E stain (left) and SEM (right) showing embolized polymer

Figure 2



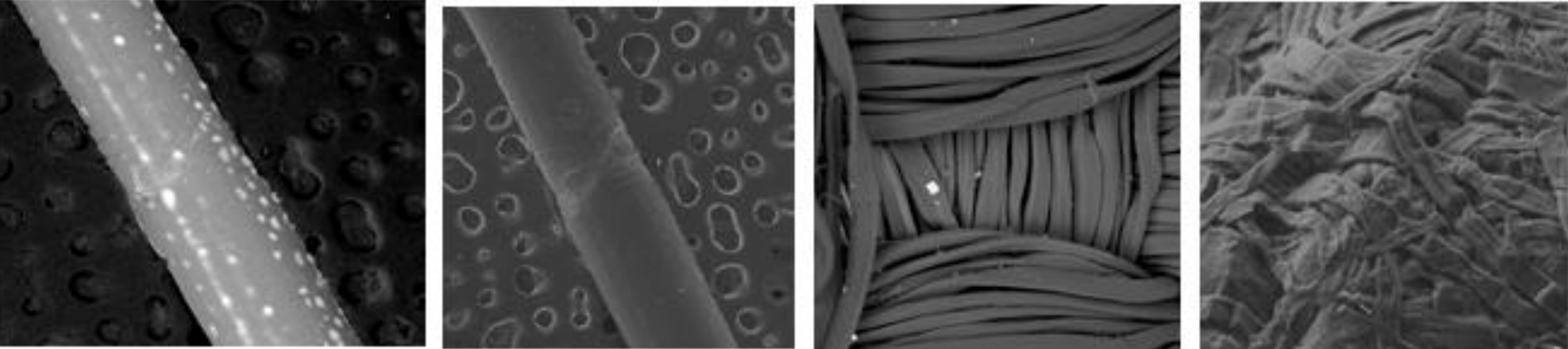
EDX spectrum of normal tissue (left) and foreign material (right).

Figure 3



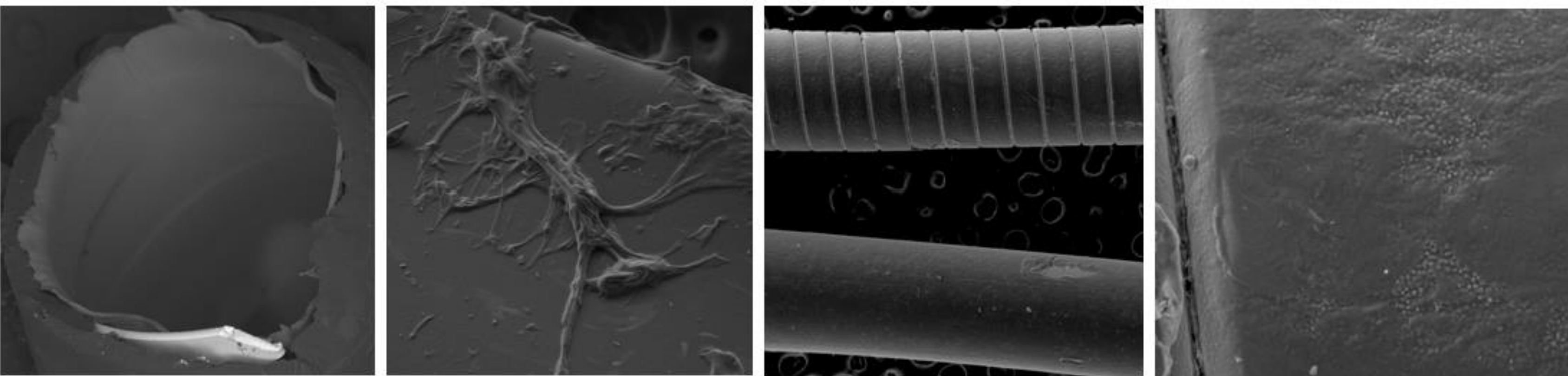
EDX spectrum of Ansel Sheath, Lunderquist Wire, Cook ZSLE, Cook Zenith, and Glidewire (Clockwise from top left)

Figure 4



SEM images of Glidewire (Left and middle left), Cook Zenith Fenestrated Main Body (Middle right) and Cook ZSLE Limb

Figure 5



SEM images of Ansel Sheath (left and middle left) and Lunderquist Wire (right and middle right)

Results

- SEM of embolized material confirmed presence of HPE (Fig 1)
- EDX of adjacent tissue revealed carbon to oxygen (C:O) ratio of 3.5 while the embolized material was significantly different with a C:O ratio of 1.5. (Fig 2 and 3)
- Devices most closely approximating target C:O ratio of 1.5 are included in the table below.

Device	C:O Ratio
Ansel Sheath	1.56
Lunderquist Wire	1.62
Glidewire	1.62
Cook Zenith Fenestrated Main Body	1.29
Cook ZSLE Limbs	1.21

Conclusion

- Our results reveal a short list of devices implicated in hydrophilic polymer embolization during complex aortic repair.
- Future studies to evaluate the rate of polymer shedding of these devices in an in vitro setting may be warranted.