Objectives:

1) Educate the otolaryngologist about the radiographic findings of injectable plastics used to treat head and neck pathology
2) Understand some of the many current and historical uses of Teflon and Silicone
3) Recognize that the radiographic features of injectable plastics can lead to false positive misinterpretation and potentially unnecessary interventions

Introduction:

Teflon (polytetrafluoroethylene) was discovered in 1938 as an inert polymer. Teflon is best known for use in the treatment of vocal cord paralysis; however, other uses include treatment of patulous Eustachian tube and velopharyngeal insufficiency. Disadvantages to its use include foreign body granuloma formation at the injection site and local and distant migration. Teflon causes an immediate inflammatory reaction, which may lead to granuloma formation in 3 to 6 months. This foreign body reaction has been shown to cause markedly false-positive PET/CT scan findings due to the propensity of FDG accumulation in both lymphocytes and macrophages.

Silicone (dimethyldiphenylsiloxane) implants have been used extensively for soft-tissue augmentation. Another form of silicone, liquid injectable silicone (LIS), has not been approved by the Food and Drug Administration, and is presently used “off-label” and outside of the United States. Silicone uses include treatment of acne scars, glabellar lines, nasolabial furrows, marionette lines, chin and cheek augmentation, and for HIV associated lipoatrophy.

Complications seen with silicone include implant slippage, and for LIS: beading, granuloma formation, and migration. The pathogenesis of granuloma formation is unknown, but is thought to be an immunologic reaction to the silicone.

Methods and Materials:

Retrospective case series illustrating the radiographic features of Teflon and silicone on PET/CT, MRI, and CT. Cases presented include Teflon use for patulous Eustachian tube, velopharyngeal insufficiency, vocal cord paralysis, and silicone use for cheek augmentation. Findings were reviewed by two neuroradiologists and a head and neck pathologist at an academic tertiary care medical center.

Results:

Teflon and silicone granulomas have similar radiographic findings of marked FDG accumulation on PET scan. On CT scans, Teflon and Silicone granulomas are characterized by heterogeneous hyperdensity. MRI demonstrates a soft tissue density isointense with muscle on T1-weighted images and hypointense to muscle on T2-weighted images. As seen in Case 5, Teflon appears as round to ovoid 50-100 micron particles with clear centers and dark borders. They are birefringent under polarized light. In granulomas, multinucleated giant cells are prominent and are associated with mild chronic inflammation.

Conclusions:

Teflon and silicone have a myriad of uses in otolaryngology as synthetic injectable fillers. Teflon uses include the treatment of vocal cord paralysis, velopharyngeal insufficiency, and patulous Eustachian tube. Silicone is used extensively in soft tissue augmentation both as an implant and for injection. However, both have side effects, including granuloma formation and implant migration. These injectable plastics demonstrate consistent CT and MR findings, as well as marked FDG accumulation on PET. Knowledge of these radiographic characteristics as well as the clinical history is important to avoid misdiagnosis and unnecessary interventions.

References: