

Future Directions for Interventional EUS

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Remarkable advances have been made in endoscopic ultrasound in recent years with endoscopic ultrasound moving from a pure diagnostic procedure to an interventional modality. Endoscopic ultrasound (EUS) guided fine needle aspiration has established its clinical impact in sampling lesions within and in close proximity to the gastrointestinal tract in multiple locations above and below the diaphragm. The development of echoendoscopes that allow real time visualization of a needle along its length has circumvented the earlier problem of EUS not being able to provide a tissue diagnosis and has opened up a host of possibilities of different interventional techniques under EUS guidance. Linear array echoendoscopes are able to visualize a needle along its long axis as well as ultrasonically monitor its depth of penetration. This has resulted in fine needle aspiration under EUS guidance becoming a standard procedure for sampling lymph nodes, pancreatic masses and submucosal lesions. Many other possibilities exist for utilization of EUS as an interventional procedure. My talk will review some recent, novel, emerging and ongoing applications/possibilities with interventional EUS. An emerging concept is the ability to perform molecular analyses on FNA material collected during EUS for detection of micrometastases, prognostication, differentiation from malignancy, predicting malignant behavior and possible response to therapy. Utilizing high frequency sound waves to define internal structures, ultrasound (US) provides an opportunity to not only diagnose disease, but to also target treatment to malignant tumors. US has several advantages over other radiology-assisted techniques that highlight its important role as a component of anticancer therapy. US provides an opportunity to administer therapy with real-time guidance. Examples include EUS guided radiofrequency application, EUS based radiation target simulation and delivery of radiation seeds under EUS guidance. Since EUS provides access to tumors in a minimally invasive fashion it is a tempting technique for the potential targeted delivery of therapeutic agents. Celiac ganglion block can be performed under EUS guidance and botulinum toxin has been injected in achalasia under EUS control. Potentially then an anti-cancer agent can be directly delivered under EUS guidance into a tumor mass in minimally invasive way. Data on various agents injected into tumors under EUS guidance will be reviewed. The high resolution imaging of EUS and ability to pass needles under EUS guidance into specific targets with precision provides an opportunity to attempt creation of anastomoses between various luminal organs and structures in the gastrointestinal tract such as hepaticogastrostomy, gastrojejunal-anastomoses, choledochoduodenostomy, and pancreaticogastrostomy. EUS may also have applications in the emerging concept of NOTES (Natural Orifice Trans Endoscopic Surgery). In conclusion, there appears to be myriad of potential applications of interventional EUS that are perhaps limited only by one's imagination.