

# Nonvascular fistula closure using Coil & Glue-In-Plug(CGIP) technique

- using Vascular plug(Type2), Coils, and Glue(N-butyl cyanoacrylate)

Ji Hoon Noh, M.D.

Department of Radiology, Inha University Hospital, Incheon, Korea

## Introduction

Coil-in-plug(CIP) and Glue-in-plug(GIP) techniques include preloading microcatheters through a vascular plug nitinol mesh for embolization in vascular procedures and closing the fistula in nonvascular procedures. Unlike vascular embolization, which induces occlusion through thrombosis, nonvascular fistula closure requires preventing the passage of various fluid components or air. Therefore, it is important to effectively fill the mesh space of the vascular plug. Coil & Glue-In-Plug(CGIP) technique, which uses both coil and glue (N-butyl cyanoacrylate) simultaneously through a preloaded microcatheter to fill the space between meshes, is considered beneficial.

## Methods

Two cases were conducted. One was the closure of a chronic broncho-esophageal fistula that occurred after surgery (Fig.1-a), and the other was the closure of a retroperitoneal abscess-colon fistula caused by necrotizing pancreatitis. The size of the vascular plug (Type 2) was adjusted to approximately 1.5 to 2.0 times the maximum width of each fistula. Using an 18-gauge indwelling needle, the expanded vascular plug was punctured (Fig.1-b). Subsequently, a 0.016" microwire was inserted through the outer sheath and preloaded along the 1.9F microcatheter. Vascular plugs were placed in the proximal opening of the fistula and the space between the meshes was packed with detachable and pushable coils (diameter: 3 to 6 mm) through a preloaded microcatheter. Finally, a glue-lipiodol mixture (1:1) was used for the remaining space (Fig.1-c).



## Result

Post-fistula closure fistulography revealed no passage of contrast medium (Fig.1-d). Moreover, radiographs showed no migration, and no major or minor complications were observed in patients.

## Conclusion

Fistula closure, unlike vascular procedures, does not naturally induce the formation of occlusive thrombosis. Therefore, effective filling of the spaces between the mesh of the vascular plug is essential, making glue(N-butyl cyanoacrylate) highly useful. However, glue is difficult to control the injection amount, so there is a risk of reflux or spread into unintended location. Therefore, it is helpful to pack the coil to physically narrow the space between the vascular meshes. Precise glue injection is possible only in the desired area. Therefore, the Coil & Glue-In-Plug (CGIP) technique, which uses a coil and glue together, is considered to be more effective for non-vascular procedures than using a coil or glue alone.