

Endoscopic Application of Mucoadhesive Powder (Nexpowder™) For Hemostasis In Patients With Gastrointestinal Bleeding

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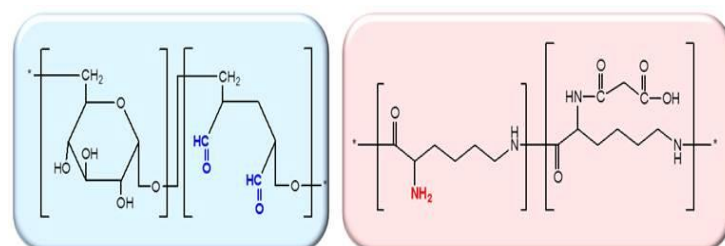
Introduction:

Endoscopic hemostasis is often challenging, depending on location, extent and features of bleeding. We have developed a new hemostatic adhesive drug loadable powder (Nexpowder™) that can be used endoscopically

Aims & Methods:

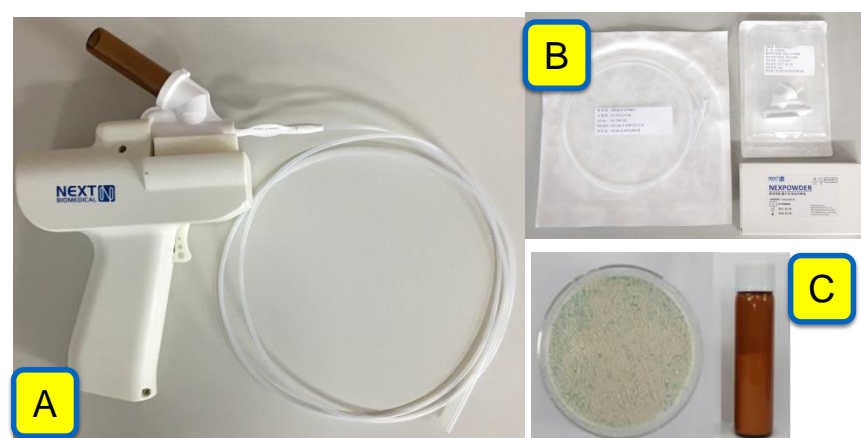
- Prospective study investigating the efficacy of Nexpowder™ in patients with various gastrointestinal bleeding.
- The Nexpowder was applied to post-ESD/EMR ulcer or to the bleeding sites undergoing insufficient hemostasis.
- Aims of this study
 - 1) the success rate of hemostasis
 - 2) re-bleeding rate on second-look endoscopy at the next day
 - 3) Persistent rate of Nexpowder™ on ulcer base at follow-up endoscopy
 - 4) clogging rate of spraying catheter during applying Nexpowder™.

Fig 1. Characteristic of Nexpowder™



Nexpowder consists of oxidized dextran and succinic acid modified amino acid. It is biodegradable and biocompatible. Powder forms the highly adhesive gel after contacting the water or blood

Fig 2. Composition of Nexpowder®



Nexpowder system consist of gun (A), catheter (B) and powder (C)

	NEXPOWDER	Hemosp ray®	Endoclot®
Shape	Granule	Granule	Powder
Clotting cascade	Unrelated	Activate	Activate
Gelation	○	X	△
Degradation time (in vivo)	24~72h	Less than few hours	Less than few hours

Results:

A total of 57 patients were enrolled. The bleeding developed in 46 patients with post-endoscopic resection ulcers (41 ESD induced ulcers and 5 EMR induced ulcers), 8 patients with peptic ulcers and 3 patients with miscellaneous bleeding.

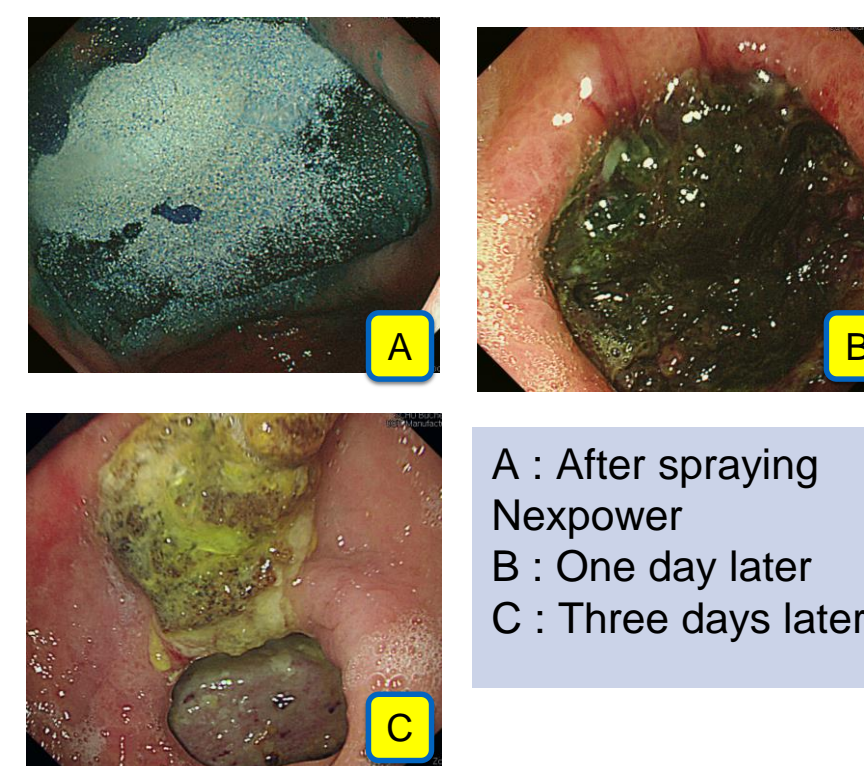
Table 2. Demographic date

Age	64.6 ± 11.2 years (Mean ± SD)
Sex	M:F = 44: 13
Reason of bleeding	Post ESD/EMR bleeding : 46 Peptic ulcer bleeding : 8 Others (AGC, Colon ESD, Jejunal ulcer) : 3

Table 2. Success Rate of Hemostasis

Etiology of Bleeding	Success Rate, %
Peptic ulcer (Stomach & Duodenum)	100 (8/8)
Endoscopic resection	97.8 (45/46)
G-EMR	100 (5/5)
G-ESD	97.5 (39/40)
D-EMR	100 (1/1)
Advanced gastric cancer (AGC)	100 (1/1)
Jejunal ulcer and liver cirrhosis	0 (0/1)
Colon ulcer	100 (1/1)
Total	96.5 (55/57)

Fig 3. Persistent Rate of Nexpowder



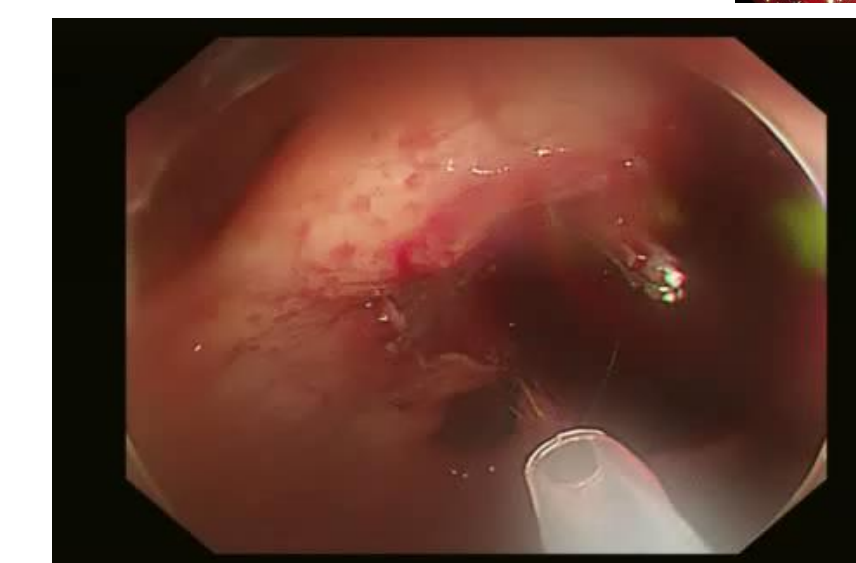
A : After spraying Nexpowder
B : One day later
C : Three days later

70.3% (26/57) at 1 day
38.5% (15/38) at 3 day

Clogging rate of spraying catheter was 4.4% (2/45).

Table 3. Rebleeding rate: 5.3% (3/57)

Case	Etiology of Bleeding	Development Time of Re-bleeding
1	Post-ESD (EGC)	1 day later
2	Post-ESD (EGC)	1 day later
3	Jejunal ulcer, Liver Cirrhosis	3 days later



Summary

- 1) Success rates of hemostasis in acute bleeding were 96.5% (55/57)
- 2) Re-bleeding rates were 5.3% (3/57)
- 3) Persistent rate of Nexpowder™ on ulcer base was 70.2% (26/37) 1 day after the procedure, and 38.4% (15/38) 3 days after the procedure
- 4) Clogging rate of spraying catheter was 4.4% (2/45).

Conclusions:

1. The endoscopic application of Nexpowder is effective for the acute GI bleeding.
2. The hemostatic action of Nexpowder appears to be from high mucoadhesiveness and hydrogel persistence.
3. The new powder delivering device shows low rate of catheter clogging and targeted spraying properties onto bleeding site