Polyethylene Glycol Hydrogel Versus Fibrin Glue Sealant For Posterior Fossa Surgery: A Budget-Impact Analysis In Five European Countries

Rafael Torrejon Torres[1], Giuseppe Talamonti[2], Jörn-André Horaczek[3], Lisa Da Deppo[4], Rhodri Saunders[1], and Marissa J. Carter[5]

(1) Coreva Scientific, Koenigswinter, Germany; (2) Niguarda Hospital, Milano, Italy; (3) International Neurosurgical Practice, Berlin, Germany; (4) Integra LifeSciences, Milano, Italy; (5) Strategic Solutions, Inc., Cody, WY, USA

ISPOR
Improving healthcare decisions

EE311

Objectives

- Posterior fossa surgeries are common in treating tumours, vascular malformations, cerebellar heamatomas, Chiari malformations and traumatic lesions.
- Dural sealants are required to seal the operative site, aid the healing process and protect the patient from CSF leaks and pathogens.
- Current practise widely relies on fibrin glue (FG) but synthetic polymers such as polyethylene glycol (PEG) hydrogel.[1,2]
- An observational prospective study found that PEG hydrogel is associated with better safety than FG.[3]
- Here we evaluate the budget-impact of switching patient treatment from FG to PEG hydrogel in five major European countries: Belgium, France, Germany, Italy, and the United Kingdom (UK).

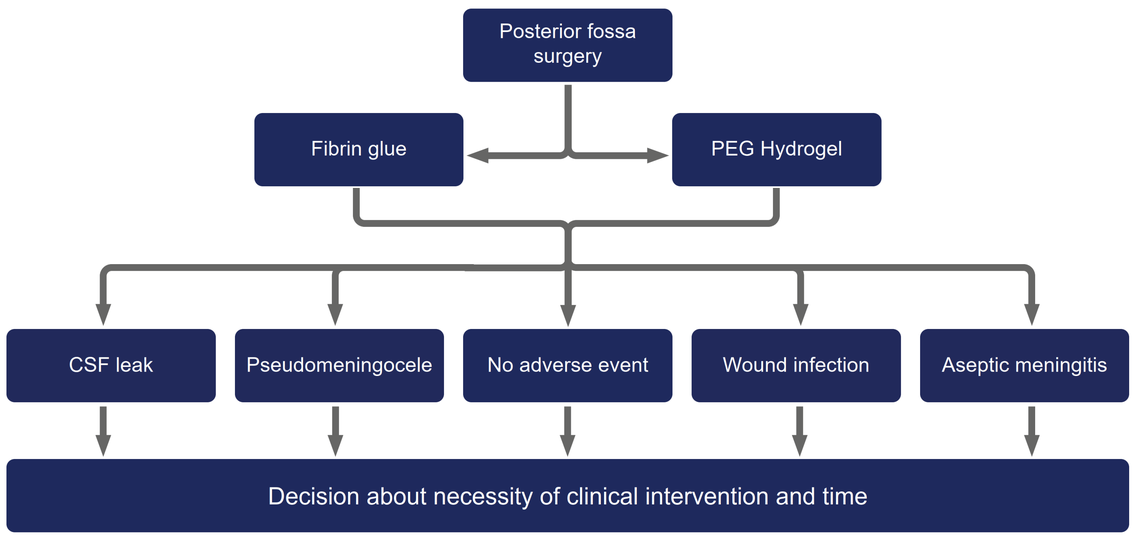

Figure 1: Pathway of the model. PEG: Polyethylene glycol hydrogel. CSF: Cerebrospinal fluid

Methods

- A decision-tree model (Figure 1) comparing FG with PEG hydrogel was adapted for Belgium, France, Germany, Italy and the UK.[4]
- Model time encompasses from surgery to four months after discharge.
- A structured review of PubMed identified Europe-specific efficacy and cost data relevant to posterior fossa surgery and sealing of the access site.
- Cost data were sourced from official reimbursement information and published literature and, if necessary, adjusted to 2021/22 rates (Table 1).
- The model accounted for postoperative events and length of stay.
- The application of dural sealants was assumed not to impact operating time.
- The complication rate for each sealant is shown in Table 2.
- One-way sensitivity analysis (OWSA) was carried out to account for the effect of key variables and input data.

Key parameters	Belgium (EUR)[5]	France (EUR)[6]	Germany (EUR)[7]	Italy (EUR)[8]	UK (GBP)*[9]
Hospital stay per day	579	125	434	333	252
Operative repair	6,837	5,421	5,056	4,109	5,872
Lumbar drain	830	1,777	1,948	2,839	3,385

Table 1: Key cost parameters. Adjusted to 2021/22 rates.

Conclusion

The adoption of PEG hydrogel is estimated to be cost-saving for posterior fossa surgeries in the five investigated countries.

Adverse events	PEG hydrogel	Fibrin glue
CSF leak	2.4%	10.0%
Pseudomenigoceles	9.6%	5.0%
Wound infection	2.4%	2.0%
Aseptic meningitis	4.0%	5.0%

Table 2: Complication rate of PEG hydrogel and fibrin glue derived from Carter (2018).[4] PEG: Polyethylene glycol.

Results

- For all five countries, the change from FG to PEG hydrogel is expected to be cost-saving (Figure 2).
- The model estimated a reduction in costs between 18% and 26% with PEG hydrogel compared to FG.
- The higher costs of the PEG hydrogel were offset by the reduction in CSF leak-related costs and a reduction in the average length of stay.
- Cost savings for CSF leaks are linked to the decreased incidence of CSF leaks.
- The OWSA showed that cost savings were retained if the CSF leak incidence was assumed equal for both sealants.

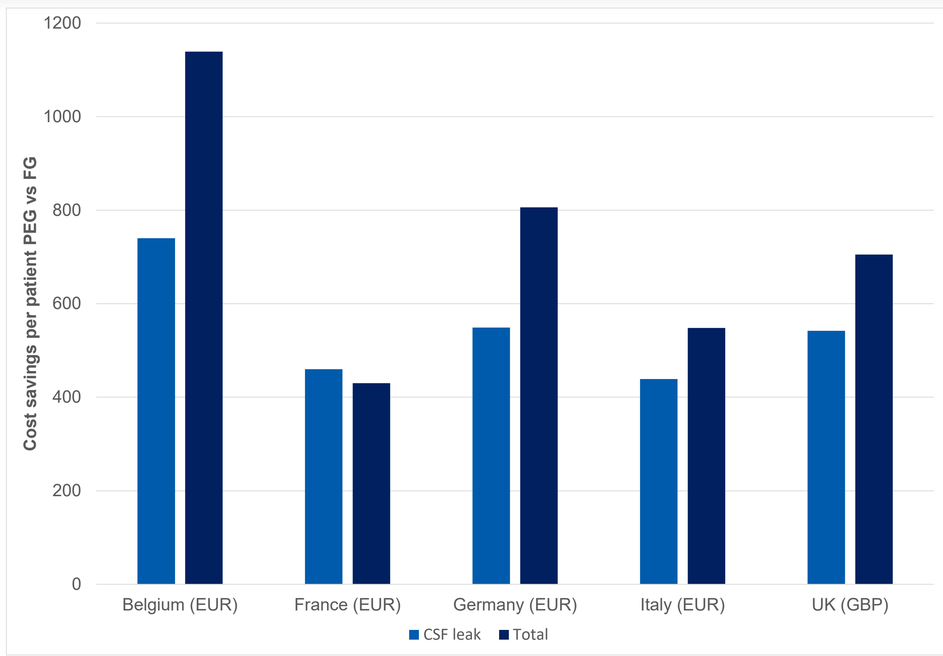

Figure 2: Cost savings of PEG hydrogel vs FG per patient for CSF leak-associated costs and total costs.
PEG: Polyethylene glycol. FG: Fibrin glue.

References

1. Biscola NP et al. J Venom Anim Toxins. 2017 **2.** Bhagat V et al. Biomacromolecules. 2017 **3.** Than KD et al. Operative Neurosurgery. 2008 **4.** Carter MJ. Journal of Health Economics and Outcomes Research. 2018 **5.** ETCT. Accessed 30/05/2022 **6.** Tarifs MCO et HAD 2020. Accessed 30/05/2022. **7.** InEK GmbH, www.g-drg.de. Flat rate catalog 2021. Accessed 30/05/2022. **8.** Gazzetta Ufficiale 10/2013, Allegato III. In: Gazzetta Ufficiale della Repubblica Italiana:27. **9.** England NH. NHS England » National tariffs 2020. Accessed 30/05/2022.

Disclosures

This research was funded by Integra Lifesciences.

RTT is an employee and RS is the owner of Coreva Scientific, who received consultancy fees for this research.

LDD is an employee of Integra Lifesciences. GT did not recieve any compensations for his contributions to the present work. JAH is a consultant to Integra Lifesciences.

3050032-1-EN