Care burden associated with sternal wound surgical site infections after coronary artery bypass graft

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Background
- Surgical site infection following coronary artery bypass graft (CABG) is a costly complication occurring in 1.6-7.4% of CABG patients in the EU¹
- Most concerning are superficial and deep sternal wound infections (SWIs) as they increase patient length of hospital stay and readmissions²

Objective
- Quantify the EU-wide care burden of SWIs following CABG procedures to estimate the economic benefits of further reductions in SWI rates

Methods
- National surveillance data and peer-reviewed European publications were searched for the following parameters:
- CABG procedures per year
- SWI rate
- Ratio of superficial to deep SWIs
- Length of hospital stay for CABG patients
- Additional length of stay due to SWIs
- Cost per day of intensive care unit and general ward

- If no data were available for a country, proxy values were used based on known EU data
- A previously presented Markov model was adapted to estimate the yearly burden of SWIs after CABG procedures

Results
- From the EU-28, sufficient data were identified in Austria, Denmark, France, Germany, Italy, Netherlands, Portugal, Spain, Sweden, and United Kingdom (72.8% of the EU28 population)
- Rates of CABG ranged from 17.86 (Spain) to 64.75 (Denmark) per 100,000 population, while 2.4% (Germany) to 10.4% (Netherlands) of CABG patients were affected by SWIs (Fig. 1)
- In these ten countries, SWIs following CABG added
  - €96.92 million per year
  - 15,172 ICU days and 79,522 general ward days
  - 3,392 readmissions
- A 1%-point reduction in the 30-day SWI rate would result in savings of €18.03 million and 24,684 bed days
- SWIs increase the average cost of CABG by €418 (UK) to €1,720 (Netherlands, Fig. 2), which meant a 5.6% (UK) to 20.1% (Portugal, Fig. 3) increase of mean costs per procedure
- Extrapolating from the ten countries to the EU-28 we estimated a SWI burden of €117.87 million per year

Discussion
- A German costing study, not used in our analysis, estimated an increase of €7,711 (Netherlands) of CABG patients were affected by SWIs
- A group in the USA reduced their DSWI to zero (over 30 months and 590 procedures) after implementation of a Six Sigma assessment, in which key implementations were: Use of disposable ECG leads & wires, antibiotic-coated sutures, silver-impregnated dressings
- Disposable ECG leads were shown to reduce SSIs by 18.8% at 30-days post CABG (reaching significance at 90-days post CABG)
- A German costing study, not used in our analysis, was available to validate the model

Conclusion
- Superficial and deep SWIs after CABG procedures come at considerable cost to healthcare providers
- An SWI reduction of 1% at 30 days could substantially reduce bed occupancy and save costs

References

Fig. 1 SWI rates. DSWI: Deep sternal wound infection, SSWI: superficial sternal wound infection. For Portugal no data on DSWI rates were available.

Fig. 2 Burden of SWIs following CABG. (A) average cost; increase per procedure. (B) per capita; black border: countries with sufficient data available; borderless: results through extrapolations based on data of other countries

Fig. 3 SWI burden contribution to average CABG procedure cost.