Organizational and Budget Impact Model (OBIM) of SAME™: A New Intraoperative Cell Salvage Or Autotransfusion System Capable of Retransfusing also Patient's Platelets

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BACKGROUND

Intraoperative cell salvage (IOCS) or autotransfusion has been described for more than 40 years as a mean of reducing impact of intraoperative blood loss[1].
SAME™ is a new generation of intraoperative cell salvage (IOCS) or autotransfusion technology for hemorrhagic surgeries, capable of recovering not only red blood cells but also the patient's platelets, thanks to its filtration technology.

This study aimed to develop an organizational and budget impact model (OBIM) with a hospital perspective to demonstrate the economic and organizational benefits of SAME™ in cardio-thoracic surgery in France.

Scenario 1
Centrifugation-based current devices
(Market share of current devices = 100%, Population = 690 patients)

Scenario 2
Centrifugation-based current devices and SAME™
(Market shares of SAME™ - Year 1 = 25% / Year 2 = 50% / Year 3 to 5 = 85%, Population = 690 patients, Procedures of SAME™ = 150)

Scenario 3
Centrifugation-based current devices
(Market share of current devices = 100%, Population = 600 patients)

Scenario 4
Centrifugation-based current devices and SAME™
(Market shares of SAME™ - Year 1 = 33% / Year 2 = 67% / Year 3 to 5 = 100%, Population = 600 patients, Procedures of SAME™ = 200)

METHODS

The OBIM was developed on Excel (Microsoft 365) and was based on two methodological guidelines issued by the French Health Authority[2,3] and hospital expectations. A pragmatic literature review was conducted to refine the relevant parameters of the model and their values.

Parameters structuring the model	Values
Number of allogeneic RBC* per patient - moderate and massive hemorrhages	4,19[4]
Number of allogeneic platelet per patient - moderate and massive hemorrhages	0,62[4]
Distribution of the target population between hemorrhages	Mild : 57% / Moderate : 23% / Massive : 20%[5]
RBC* cost	€353.66[6]
Platelet cost	€777.65[7]
Nurse time by allogeneic RBC* transfused	50.59 minutes[6]
Destruction of labile blood products	1.95%[6]

*RBC : Red Blood Cell

RESULTS

Budget Impacts

With an active patient queue of 690 cardio-thoracic surgery patients and 150 annual procedures per year performed with one SAME™ system (depending on the number of operating rooms), the SAME™ autotransfusion system yields an annual cost-saving of 36 500€ in Year 1 and 124 000€ in Year 5 (Fig. 2). Over the five-year period with the gradual replacement of the machine fleet by SAME™, the budget impact analysis demonstrated substantial savings induced using this new autotransfusion medical device, with cumulative savings amounting to 481 000€ for the entire population (Fig. 2).
These savings were associated to a reduction of 45% of RBC transfusion associated with a reduction of 60% and 90% of platelet use with SAME™ system for moderate and massive hemorrhages respectively[8].

Two other scenarios (3 and 4) were modelled with a different number of patients (=600 patients) and annual procedures of SAME™ (=200 procedures). Based on these new data, the savings over five years for the entire population amount to 535 000€ (Fig.4).

Fig. 1 - Annual costs on all population

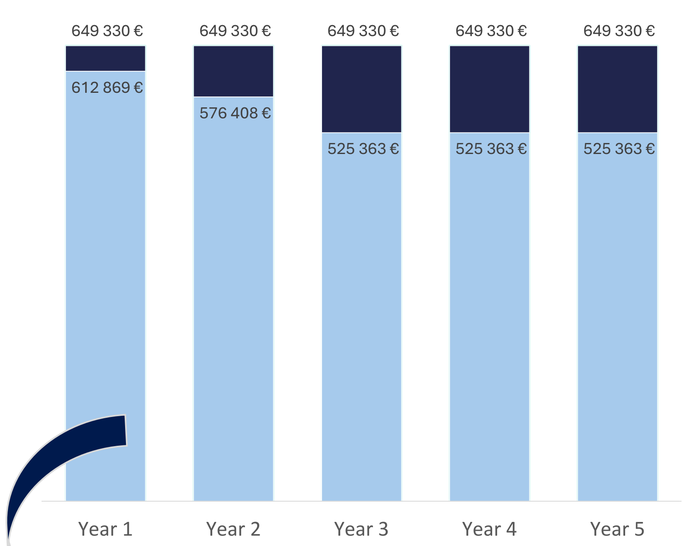


Fig. 2 - Budget impacts (scenario 2 – scenario 1)

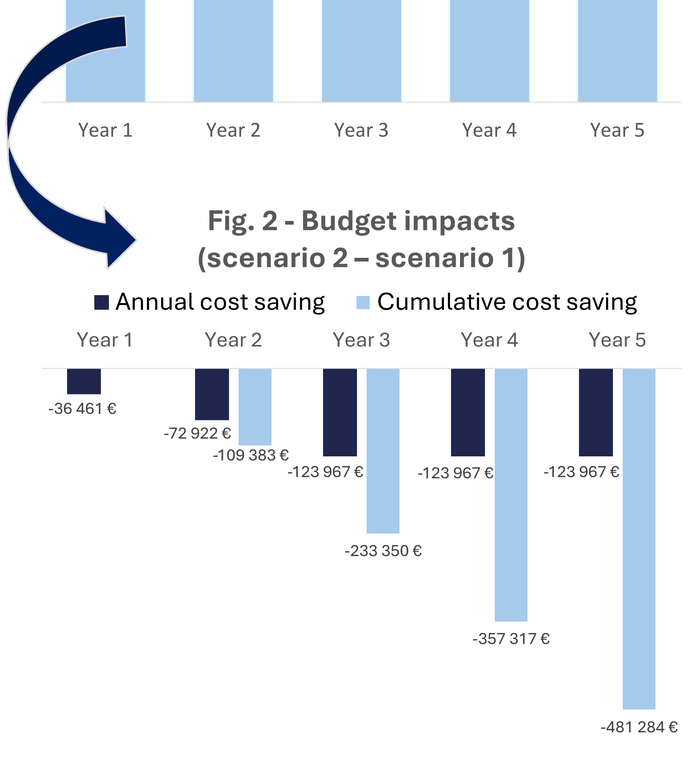


Fig. 3 - Annual costs on all population

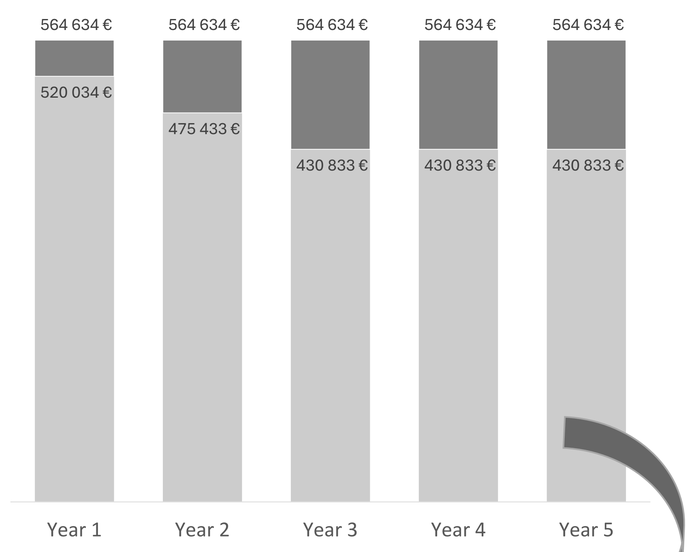
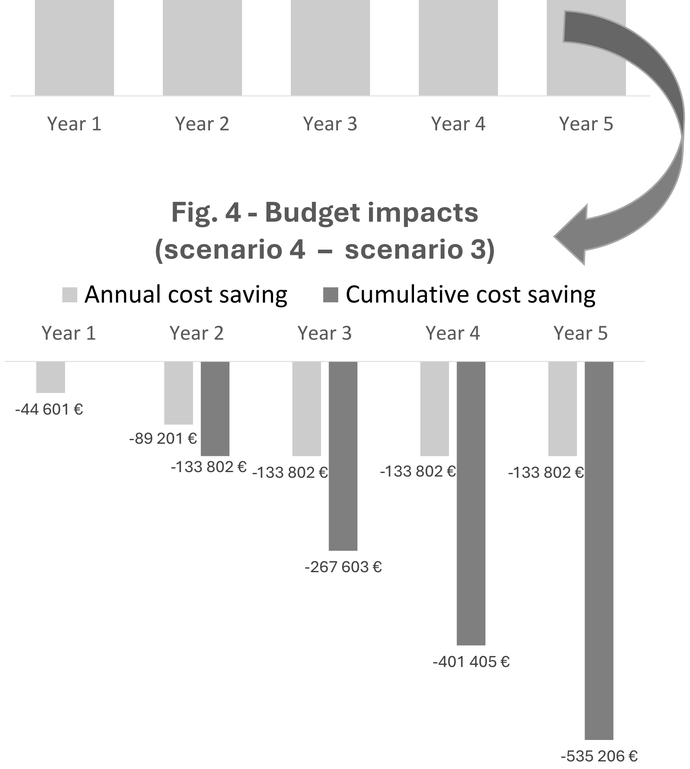


Fig. 4 - Budget impacts (scenario 4 – scenario 3)



Organizational Impacts

Organizational impacts also revealed a reduction in hospital professional time, with nurse and medical time decreased by 11% overall. Specifically, annual nurse time savings were estimated at 7,130 minutes (approximately 15 8-hour working days per year), and medical time savings at 1,657 minutes (approximately 3 8-hour working days per year).
Additionally, the use of the SAME™ system in the first year resulted in an estimated 18% reduction in adverse effects due to allogeneic platelets transfusion and a 13% reduction in the loss of labile blood products.

Fig. 5 - Nurse time gain
(minutes)

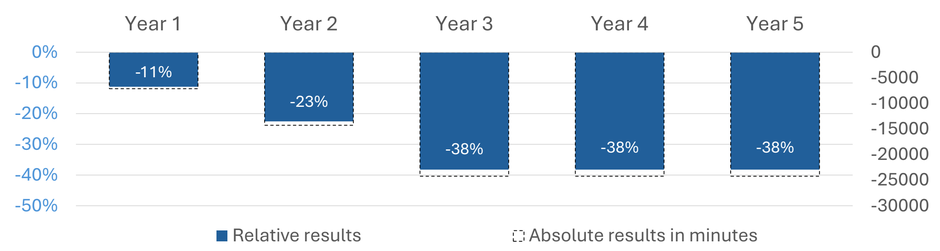
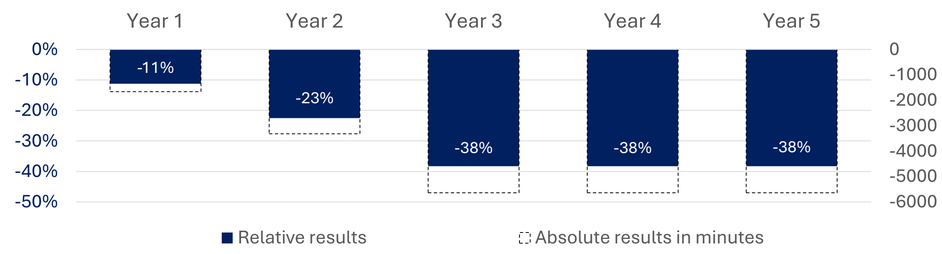


Fig. 6 - Medical time gain
(minutes)



CONCLUSION

The results of this OBIM demonstrated the economic and organizational benefits of SAME™ compared to the standard centrifugation-based systems used in French hospitals. Indeed, the reduction in the use of allogeneic blood products (RBCs, platelets) when using SAME™ system presented substantial economic and organizational advantages while aligning with the goals of Patient Blood Management.

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