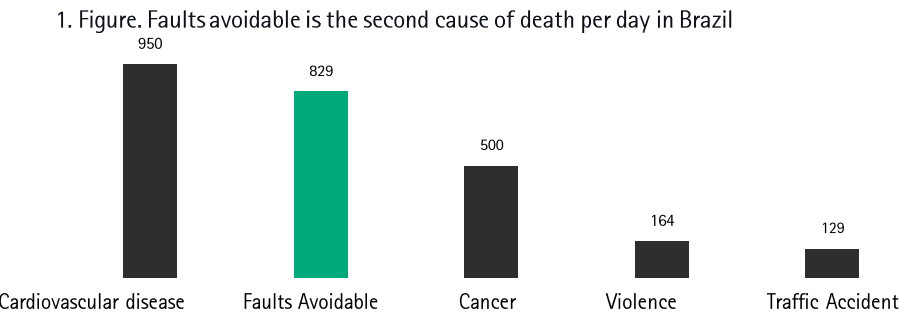


Cost Benefits of Midazolam Ready-to-Use Solution Versus IV Drugs in Local Anesthesia

Cristina Ferreira, Melissa Corrêa Leal Gardengui, Carolina de Jesus Oliveira, BBraun Brazil

Introduction: Adverse events in hospitals are the second leading cause of death in Brazil. Every 5 minutes, 3 Brazilians die from preventable hospital failures¹, and 42,8% of the events could have been avoidable². A unified drug dose can ensure a lower error probability, in line with International Patient Safety goals. Considering the risks associated with intravenous (IV) drugs, ready-to-use solutions could be one opportunity to reduce the number of deaths and adverse events³.



Objective: Demonstrate the cost benefits of the ready-to-use solution of midazolam (MRTU). According to the literature review, the failure caused by administrating drug errors represents 34,8% of adverse events in the hospital environment. Therefore, the ready-to-use solution could be an alternative to minimize the risks and errors.

Methods: The following cost components were evaluated for anesthesia of Midazolam dose (100mg;dose) for patient with a weight of 70kg, based on:

- CMED list (2022)for Midazolam ready-to-use (MRTU) and Conventional midazolam IV (MIV);
- Adverse effects caused by failure;
- Consumption of inputs;
- Cost staffs.

All these outcomes were based on bibliographic reviews and Brazilian official price lists (2022 values). The perspective is the private Brazilian health system.

1. Table. Measured costs – microcosting

INPUTS FOR AN INFUSION	Amount	Unit Price	Source ¹	Reference ²
SYRINGE COST	1	R\$ 4,93	Brasíndice	BR990189
DISPOSABLE NEEDLE COST	1	R\$ 1,91	Brasíndice	BR300110
INFUSION BAG COST	1	R\$ 4,14	Brasíndice	BR0369555
EQUIPO COST	1	R\$ 53,50	Brasíndice	BR0385638
		R\$ 64,48		

Nursing technician salary floor	Value	Working hours	Charges	Minute value
Nursing technician salary floor	R\$ 2.375,00	36	R\$ 2.375,00	R\$ 0,27

Source: Cofen ; Conselho Federal de Enfermagem / Brasíndice

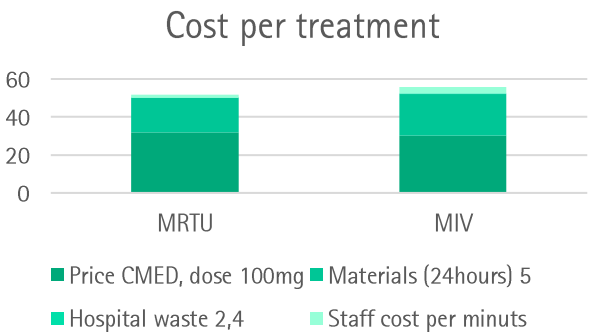
2. Table Others possible outcomes

	Clinical	Costs
Adverse events ²	32%	
Preventable adverse events ^{2,3}	43%	BRL 2,449
Death ^{2,4}	14%	BRL 24,581
Occupational accidents	66%	

3. Table . Cost of sedation

	MRTU	MIV
Price CMED, dose 100mg	BRL 32	BRL 30
Materials (24hours) ⁵	BRL 18	BRL 22
Hospital waste ^{2,4}	BRL 0,12	BRL 0,41
Staff cost per minuts	BRL 1,66	BRL 3,33
TOTAL	BRL 52	BRL 56

Results: Based on the cost of dose consumption of drugs, supplies, labor, and adverse events, the customary charge for using each MRTU was: BRL 75, with MIV 104. However, when analyzing the adverse events isolated caused by failures, the saving with MRTU was 2,479, and the return on investment with MRTU can be BRL 34 per dose



Conclusions

With more economic savings/cost-benefit, the ready-to-use use of midazolam can reach BRL 28, or 27%. In addition, it reduces the consumption of labor time by 50%, 14% of death, 66% of occupation accidents, and 71% of waste.

Meanwhile, MIV was the most expensive. The most appropriate treatment can reduce the likelihood of complications from adverse effects and the length of hospital stay—consequently, better hospital financial results and patient quality of life.

References

1. TRAVASSOS, C. ; PORTO, S. ; MARTINS, M. ; MENDES, W. ; A magnitude financeira dos eventos adversos em hospitais no Brasil. Revista Portuguesa de Saúde Pública ; Vol. Temático(10): 74-80; 2010

2. Curatolo CJ ; McCormick PJ ; Hyman JB ; Belin Y ; Preventable Anesthesia-Related Adverse Events at a Large Tertiary Care Center: A Nine-YearRetrospective Analysis.Joint Commission Journal on Quality and Safety ; 44(12): 708-718.; 2019. DOI: 10.1016/j.jcjq.2018.03.013.

3. CBHPM; Classificação Brasileira Hierarquizada de Procedimentos Médicos – CBHPM 2012.

4. Santos MC, Ferreira CN, Squiassi HB, Santana CF; The Economic Cost of a Death Event in the Brazilian Private Health Care System. Value in Health , Vol. 19 , Issue 3, PA29 ; Maio 2016; Acesso em DOI: <https://doi.org/10.1016/j.jval.2016.03.349> . Acesso em março 2022.

5. NOGUEIRA DNG et Al; Resíduos de serviços de saúde: mapeamento de processo e gestão de custos como estratégias para sustentabilidade em um centro cirúrgico ; REGE - Revista de Gestão Volume 23, Issue 4, October–December 2016, Pages 362-374; <https://doi.org/10.1016/j.rege.2016.09.007>

6. BATISTA M.; Piso salarial enfermagem; UOL 22 out 2022. Disponível: <https://jc.ne10.uol.com.br/colunas/saude-e-bem-estar/2022/10/15103526-piso-salarial-enfermagem-tabela-2022-veja-os-novos-valores-do-piso-salarial-da-enfermagem-da-categoria.html>

7. TRAVASSOS, C. ; et al.; A magnitude financeira dos eventos adversos em hospitais no Brasil. Revista Portuguesa de Saúde Pública ; Vol. Temático(10): 74-80; 2010; Disponível: <https://www.elsevier.es/en-revista-revista-portuguesa-saude-publica-323-pdf-X0870902510898606>

8. CURATOLO, C.J. ; MCCORMICK PJ. ; HYMAN JB. ; BELIN Y. ; Preventable Anesthesia-Related Adverse Events at a Large Tertiary Care Center: A Nine-YearRetrospective Analysis.Joint Commission Journal on Quality and Safety ; 44(12): 708-718.; 2019. DOI: 10.1016/j.jcjq.2018.03.013. Disponível: <https://pubmed.ncbi.nlm.nih.gov/30064954/>

9. CBHPM; Classificação Brasileira Hierarquizada de Procedimentos Médicos – CBHPM 2012. Disponível: <https://sbacsp.com.br/Procedimentos/Tabela-CBHPM-Geral.pdf>

10. Santos MC, Ferreira CN, Squiassi HB, Santana CF; The Economic Cost of a Death Event in the Brazilian Private Health Care System. Value in Health , Vol. 19 , Issue 3, PA29 ; Maio 2016; Acesso em DOI: <https://doi.org/10.1016/j.jval.2016.03.349> . Acesso em março 2022.

11. LIMA et al. Occupational Accidents Sharps: Study With Nursing. Revista Interdisciplinar em Saúde, Cajazeiras, 2 (1): 26-43, jan./mar. 2015, ISSN: 2358-7490.

12. Ministério da Educação; Metas Internacionais de Segurança do Paciente; Empresas Brasileiras de Serviços Hospitalares; 07/06/2021Disponível: <https://www.gov.br/ebserh/pt-br/hospitais-universitarios/regiao-sudeste/hc-ufmg/saude/metas-internacionais-de-seguranca-do-paciente/metas-internacionais-de-seguranca-do-paciente>