Inadequate emergence after anesthesia for curative neoplastic surgery: emergence delirium and hypoactive emergence

Braga A.¹, Silva D.¹, Tavares L.², Santos A.¹, Abelha F.^{1,2}

¹Hospital São João, Dept of Anaesthesiology / ²Faculdade de Medicina Universidade do Porto (FMUP)

Background and Goal of Study:

Inadequate emergence after anesthesia can be characterized by the patient's activity level into two subtypes: emergence delirium and hypoactive emergence. The aim of this study was to evaluate the incidence and determinants of inadequate emergence after curative neoplastic surgery.

Materials and Methods:

- Prospective observational study (Jun 2016 to Oct 2016)
- **Inclusion criteria:** Patients scheduled for elective cancer surgeries with a curative intent admitted at Post Anesthetic Care Unit (PACU).
- **Exclusion criteria:** Age < 18 years old and inability to give informed consent.
- **Inadequate emergence of anesthesia (IEA):** Richmond Agitation and Sedation Scale (RASS) 10 minutes after admission at PACU.
  - **Emergence delirium:** RASS score >+1.
  - **Hypoactive emergence:** RASS score < -2.
- Post-operative Quality of Recovery Scale (PQRS) was applied before (T0) and after surgery at minute 15 (T15) and 40 (T40), at day 1 and 3 (D1, D3) evaluating recovery in five domains. Recovery was defined as return to baseline values or better for all questions within each domain.
- **Postoperative delirium** assessed with NuDESC

Patient's demographics data and perioperative variables were recorded. The Chi-square, Fischer's exact or Mann-Whitney U tests were applied for comparisons. Variables were considered significant if $p < 0.05$.

Table 1 –Demographics and perioperative variables

	IEA N=48	Non-IEA N= 100	p value
Age (years), median [P25-P75]	69 [58.0-78.8]	64 [52.3-72.8]	0.017^c
High risk surgery, n (%)	31 (64.6)	28 (28.0)	0.001^a
Congestive heart disease, n (%)	12 (25.0)	5 (5.0)	<0.001^a
Cerebrovascular disease	4 (8.3)	0 (0)	0.010^b
ASA ≥ III, n (%)	23 (47.9)	28 (28.0)	0.017^a
Duration of anesthesia (min) , median [P25-P75]	180 [140.0-248.0]	128 [93.0-180.0]	<0.001^c
Postoperative delirium, n (%)	13 (27.0)	10 (10.0)	0.007^a
Length of stay PACU (min), median [P25-P75]	196 [120.0-1000.0]	125 [85.0-181.5]	<0.001^c
Length of stay hospital, (days), median [P25-P75]	7 [5.3-11.5]	6 [2.0-8.0]	<0.001^c

Table 2 – Recovery according to PQRS

Complete recovery PQRS: domains		IEA	Non-IEA	p value
Physiological n (%)	T15	2 (4.2)	16 (16.0)	0.030^a
	T40	9 (19.1)	31 (31.3)	0.124 ^a
	D1	25 (53.2)	80 (83.3)	<0.001^a
Noceptive, n (%)	T15	39 (81.3)	74 (74.0)	0.331 ^a
	T40	35 (74.5)	69 (69.7)	0.552 ^a
	D1	38 (82.6)	67 (69.1)	0.087 ^a
	D3	33 (76.7)	71 (73.2)	0.658 ^a
Emotive, n (%)	T15	23 (47.9)	27 (27.0)	<0.001^a
	T40	26 (55.3)	23 (23.2)	<0.001^a
	D1	22 (47.8)	34 (35.1)	0.144 ^a
	D3	27 (61.4)	29 (30.2)	<0.001^a
Cognitive, n (%)	T15	4 (8.3)	7 (7.0)	0.504 ^b
	T40	7 (15.2)	16 (16.0)	0.904 ^a
	D1	12 (26.7)	15 (15.3)	0.107 ^a
	D3	7 (15.9)	22 (22.9)	0.342 ^a
Functional n (%)	T40	6 (12.8)	21 (21.9)	0.219 ^a
	D1	14 (29.8)	33 (34.4)	0.583 ^a
	D3	14 (31.8)	51 (53.1)	0.019^a

a) Chi-square; b) Fischer's exact; c) Mann-Whitney U tests

Results and Discussion:

Conclusion:

Inadequate emergence after surgery was a frequent complication and was associated with delirium. Patients with IEA were older, had more comorbidities and stayed longer at PACU and at hospital. These patients recovered less frequently in physiological and functional domains but faster in emotive domain.