**Supplemental digital content to**

**“Intraoperative ventilator settings and their association with postoperative pulmonary complications in neurosurgical patients “**

**Contents**

Page 3 Table S1. STROBE Statement checklist

Page 6 List of LAS VEGAS study Network Collaborators

Page 13 Table S2. a, b. Full list of participating centres

Page 17 Table S3. Hospital characteristics of participating centres

Page 18 Table S4. Definition of recruitment manoeuvres

Page 18 Table S5. Definition of postoperative pulmonary complications

Page 19 Table S6. Definition of intraoperative complications

Page 20 Table S7. Univariate and multivariate logistic regression

Page 23 Figure FC. Flow-chart of patient’s inclusion criteria

Page 24 Figure S1. Settings of different hourly intraoperative factors over time.

Page 26 Figure S2. Combinations of ventilator settings in patients undergoing brain or spine surgery.

Page 28 Figure S3. Combinations of ventilator settings in patients with ARISCAT<26 and ARISCAT ≥26.

Page 30 Figure S4. Kaplan Meier plots

Page 32 Figure S5, Interaction between type of neurosurgery and age continuous on PPC as outcome

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| Table S1. STROBE Statement checklist | | | |
|  | Item No. | Recommendation | Page  No. |
| **Title and abstract** | 1 | (*a*) Indicate the study’s design with a commonly used term in the title or the abstract | 1 |
| (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | 3 |
| Introduction | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | 4 |
| Objectives | 3 | State specific objectives, including any pre–specified hypotheses | 4 |
| Methods | | | |
| Study design | 4 | Present key elements of study design early in the paper | 5 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | 5 |
| Participants | 6 | (*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up | 5 |
| (*b*)*Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed | NA |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | 5 |
| Data sources/ measurement | 8\* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | 6 |
| Bias | 9 | Describe any efforts to address potential sources of bias | 6 |
| Study size | 10 | Explain how the study size was arrived at | 6 |

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| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | 6 |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | 7 |
| (*b*) Describe any methods used to examine subgroups and interactions | 7 |
| (*c*) Explain how missing data were addressed | 7 |
| (*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed | 7 |
| (*e*) Describe any sensitivity analyses | 7 |
| Participants | 13\* | (a) Report numbers of individuals at each stage of study—e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | 6 |
| (b) Give reasons for non-participation at each stage | 6 |
| (c) Consider use of a flow diagram | 6 |
| Descriptive data | 14\* | (a) Give characteristics of study participants (e.g. demographic, clinical, social) and information on exposures and potential confounders | 6 |
| (b) Indicate number of participants with missing data for each variable of interest | NA |
| (c) *Cohort study*—Summarise follow-up time (e.g., average and total amount) | NA |
| Outcome data | 15\* | *Cohort study*—Report numbers of outcome events or summary measures over time | *7* |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included | 8-9 |
| (*b*) Report category boundaries when continuous variables were categorized | 8-9 |
| (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | 8-9 |

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| Other analyses | 17 | Report other analyses done - e.g. analyses of subgroups and interactions, and sensitivity analyses | NA |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | 9,10 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | 15 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | 10-14 |
| Generalizability | 21 | Discuss the generalizability (external validity) of the study results | 11-14 |
| Other information | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | 2 |

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| **Table S2 b. Full list of participating centres** | | | |
| **Country** | **City** | **Institution** | **# Patients** |
| Austria | Graz | LKH Graz | 51 |
| Austria | Linz | AKH Linz | 40 |
| Austria | Vienna | Medical University Vienna | 34 |
| Belgium | Brussels | UCL - Cliniques Universitaires Saint Luc Brussels | 119 |
| Belgium | Brussels | Universitary Hospital Brussels (UZ Brussel) | 27 |
| Belgium | Genk | Het ZOL (Ziekenhuis Oost Limburg) | 65 |
| Belgium | Gent | Ghent University Hospital | 154 |
| Belgium | Gent | Maria Middelares Gent | 10 |
| Bosnia and Herzegovina | Sarajevo | General Hospital “prim Dr Abdulah Nakas” Sarajevo | 48 |
| Croatia | Cakovec | General Hospital Čakovec | 40 |
| Croatia | Karlovac | General Hospital Karlovac | 28 |
| Croatia | Osijek | University Clinical Hospital Osijek | 125 |
| Croatia | RIJEKA | University Hospital Rijeka | 53 |
| Croatia | Slavonski Brod | General Hospital Dr J Bencevic | 46 |
| Croatia | Split | University Hospital Center Split | 96 |
| Croatia | Zagreb | University Hospital Merkur | 48 |
| Croatia | Zagreb | University Hospital Sveti Duh | 59 |
| Croatia | Zagreb | University Hospital, Medical school, “Sestre milosrdnice” (Sister of Charity) | 85 |
| Czech Republic | Brno | University Hospital Brno | 149 |
| Czech Republic | Hradec Kralove | University Hospital Hradec Kralove | 82 |
| Czech Republic | Ostrava | University Hospital Ostrava | 102 |
| Czech Republic | Znojmo | Nemocnice Znojmo, p.o. | 62 |
| Egypt | Cairo | El Sahel Teaching hospital | 62 |
| Egypt | Cairo | Kasr Al-Ainy Medical School, Cairo University | 38 |
| Egypt | Giza | Beni Sueif University Hospital | 42 |
| Egypt | Giza | Fayoum University Hospital | 49 |
| Egypt | Suis | Suis medical Insurance Hospital | 48 |
| Estonia | Tallinn | North Estonia Medical Center | 164 |
| Estonia | Tartu | Tartu University Hospital | 80 |
| France | Clermont-Ferrand | Estaing Hospital, University Hospital of Clermont-Ferrand | 30 |
| France | Levallois-Perret | Institut Hospitalier Franco-Britannique | 21 |
| France | Montpellier | Saint Eloi University Hospital, Montpellier | 140 |
| Germany | Coswig | Fachkrankenhaus Coswig Gmbh, centre for pneumology and thoracic surgery | 10 |
| Germany | Dresden | University Hospital Carl Gustav Carus | 219 |
| Germany | Duesseldorf | Duesseldorf University Hospital, Heinrich-Heine University | 129 |
| Germany | Hannover | Diakoniekrankenhaus Friederikenstift | 133 |
| Germany | Leipzig | University of Leipzig | 71 |
| Greece | Athens | “Alexandra” general hospital of Athens | 43 |
| Greece | Athens | 251 General air force hospital | 41 |
| Greece | Athens | Aretaieion University Hospital | 41 |
| Greece | Athens | Attikon University Hospital | 54 |
| Greece | Thessaloniki | Ahepa University Hospital Thessaloniki | 50 |
| Israel | Haifa | The Lady Davis Carmel Medical Center | 40 |
| Italy | Bari | Ospedale San. Paolo Bari | 35 |
| Italy | Bari | University of Bari “Aldo Moro” | 81 |
| Italy | Candiolo (Turin) | Institute for Cancer Research and treatment | 28 |
| Italy | Catania | Azienda Ospedaliera per l’emergenza Cannizzaro | 39 |
| Italy | Cernuso (Milano) | Ospedale Melegnano | 5 |
| Italy | Ferrara | Azienda Ospedaliera – Universitaria Sant’Anna (Ferrara) | 88 |
| Italy | Foggia | Ospedali Riuniti Di Foggia - University of Foggia | 85 |
| Italy | Genoa | IRCCS San Martino AOU IST Hospital, University of Genoa | 173 |
| Italy | Milano | IRCCS San Raffaele Scientific Institute | 156 |
| Italy | Milano | Istituto europeo di oncologia - ieo | 131 |
| Italy | Milano | Ospedale Niguarda Ca'Granda Milano | 19 |
| Italy | Milano | Ospedale San Paolo - University of Milano | 46 |
| Italy | Naples | University of Naples “Federico II” | 57 |
| Italy | Palermo | Policlinico "P. Giaccone" | 92 |
| Italy | Parma | Azienda Ospedaliero-Universitaria | 81 |
| Italy | Pordenone | Santa Maria degli Angeli | 18 |
| Italy | Prato | Ospedale Misericordia e Dolce - Usl4 Prato | 41 |
| Italy | Sassari | University hospital of Sassari | 54 |
| Italy | Varese | Insubria University | 125 |
| Lithuania | Kaunas | Kaunas Medical University Hospital, Hospital of Lithuanian University of Health Sciences | 160 |
| Lithuania | Vilnius | Vilnius University Hospital - Institute of Oncology | 108 |
| Lithuania | Vilnius | Vilnius University Hospital - Santariskiu Clinics | 104 |
| Malta | Msida | Mater Dei Hospital | 27 |
| Netherlands | Amsterdam | Academic Medical Center, University of Amsterdam | 183 |
| Netherlands | Amsterdam | VU University Medical Center | 104 |
| Netherlands | Den Haag | MC Haaglanden | 94 |
| Netherlands | Hoorn | Westfriesgasthuis | 104 |
| Norway | Bergen | Haukeland University Hospital | 106 |
| Norway | Førde | Førde Central Hospital /Førde Sentral Sykehus | 58 |
| Norway | Gjettum | Martina Hansens Hospital | 57 |
| Norway | Rud | Bærum Hospital, Vestre Viken | 57 |
| Norway | Stavanger | Stavanger University Hospital | 70 |
| Panama | Panama | Hospital Santo Tomás | 40 |
| Portugal | Évora | Hospital do Espírito Santo - Évora, EPE. | 55 |
| Portugal | Lisboa | Centro Hospitalar de Lisboa Central, EPE | 49 |
| Portugal | Lisboa | Centro Hospitalar de Lisboa Ocidental, EPE | 41 |
| Portugal | Santarem | Santarem Hospital | 44 |
| Republic of Kosovo | Gjakovë | Distric hospital Gjakova | 9 |
| Republic of Kosovo | Prishtina | University Clinical Center of Kosova | 92 |
| Republic of Kosovo | Prizren | Regional Hospital ”Prim.Dr. Daut Mustafa” | 39 |
| Romania | Bolintin Vale | Spital orasenesc Bolintin Vale | 8 |
| Romania | Bucharest | Clinical Emergency Hospital of Bucharest | 58 |
| Romania | Bucharest | Elias University Emergency Hospital | 53 |
| Romania | Bucharest | Emergency Institute of Cardiovascular Diseases Inst. ''Prof. C. C. Iliescu'' | 6 |
| Romania | Bucharest | Fundeni Clinical institute - Anaesthesia and Intensive Care | 43 |
| Romania | Bucharest | Fundeni Clinical institute - Intensive Care Unit | 40 |
| Romania | Bucharest | Hospital Profesor D Gerota | 21 |
| Romania | Constanta | Constanta County Emergency Hospital | 73 |
| Romania | Targu Mures | University Emergency County Hospital Targu Mures | 138 |
| Russia | Krasnoyarsk | Krasnoyarsk State Medical University | 52 |
| Russia | Moscow | Burdenko Neurosurgery Institute | 60 |
| Russia | Moscow | Moscow Regional Research Clinical Institute | 59 |
| Russia | Moscow | Municipal Clinical Hospital 7 | 49 |
| Russia | Moscow | Reanimatology Research Institute n.a. Negovskij RAMS | 61 |
| Serbia | Novisad | Clinical Center of Vojvodina, Emergency Center | 42 |
| Slovakia | Bratislava | National Cancer Institute | 18 |
| Slovakia | Banská Bystrica | F.D.Roosevelt teaching Hospital | 64 |
| Slovakia | Nové Zámky | Faculty Hospital Nove Zamky | 47 |
| Slovenia | Ljubljana | Institute of Oncology Ljubljana | 64 |
| Slovenia | Ljubljana | University Medical Centre Ljubljana | 108 |
| Spain | Barcelona | Hospital Sant Pau | 73 |
| Spain | Barcelona | Hospital Universitari Germans Trias I Pujol | 103 |
| Spain | Pamplona | University of Navarra | 90 |
| Spain | Sabadell | Corporacion Sanitaria Parc Tauli | 66 |
| Spain | Valencia | Consorcio Hospital General Universitario de Valencia | 61 |
| Spain | Valencia | Hospital Clinico Valencia | 62 |
| Spain | Valladolid | Hospital Universitario Rio Hortega | 82 |
| Sweden | Kristianstad | Central Hospital in Kristianstad | 83 |
| Turkey | Ankara | Ufuk University Hospital Ankara | 30 |
| Turkey | Antalya | Akdeniz University Hospital | 165 |
| Turkey | Istanbul | Istanbul university, Istanbul medical faculty | 81 |
| Turkey | Istanbul | Acibadem University | 25 |
| Turkey | Istanbul | Maltepe University | 37 |
| Turkey | Izmir | Dokuz Eylül Universitesi Tip Fakültesi | 161 |
| Turkey | Izmir | Şifa University Hospital / İzmir | 74 |
| Turkey | Konya | Selcuk University faculty of medicine | 138 |
| Turkey | Istanbul | Fatih Sultan Mehmet Eğitim Ve Araştirma Hastanesi | 53 |
| Ukraine | Kiev | Institute Of Surgery And Transplantology | 17 |
| Ukraine | Zaporizhzhia | Zaporizhzhia State Medical University | 18 |
| United Kingdom | Barnstaple | Northern Devon Healthcare NHS Trust | 69 |
| United Kingdom | Clydebank, Scotland | Golden Jubilee National Hospital | 67 |
| United Kingdom | Darlington | Darlington Memorial Hospital, County Durham and Darlington Foundation NHS Trust | 54 |
| United Kingdom | Derby | Royal Derby Hospital | 59 |
| United Kingdom | Dorchester | Dorset County Hospital | 63 |
| United Kingdom | Essex | The Princess Alexandra NHS Hospital Trust | 71 |
| United Kingdom | Exeter | Royal Devon and Exeter NHS Foundation Trust | 123 |
| United Kingdom | Great Yarmouth | Hospital James Paget University Hospital NHS Foundation Trust | 43 |
| United Kingdom | Guildford | Royal Surrey County Hospital NHS Foundation Trust | 70 |
| United Kingdom | Kettering | Kettering General Hospital NHS Foundation Trust | 40 |
| United Kingdom | London | Barts Health NHS Trust, Royal London Hospital | 104 |
| United Kingdom | Newcastle upon Tyne | Newcastle Upon Tyne Hospitals NHS Trust The Freeman Hospital High Heaton | 125 |
| United Kingdom | Plymouth | Derriford Hospital Plymouth Hospitals NHS Trust | 179 |
| United Kingdom | Sheffield | Royal Hallamshire Hospital | 103 |
| United Kingdom | Stafford | Mid Staffordshire NHS | 28 |
| United Kingdom | Taunton | Musgrove Park Hospital | 50 |
| United Kingdom | Torquay, Torbay | South Devon Healthcare NHS Foundation Trust /Torbay Hospital, | 83 |
| United Kingdom | Truro | Royal Cornwall Hospital | 81 |
| United Kingdom | Wakefield | Mid Yorkshire Hospitals NHS Trust; Pinderfields Hospital | 65 |
| United Kingdom | West Bromich | Sandwell and West Birmingham NHS Trust | 127 |
| United Kingdom | York | York Teaching Hospitals NHS Foundation Trust | 81 |
| United States | Aurora, Colorado | University of Colorado School of Medicine/University of Colorado Hospital | 56 |
| United States | Boston | Massachusetts General Hospital, Boston | 120 |
| United States | Rochester | Mayo Clinic | 200 |

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| **Table S3. Hospital characteristics of participating centres** | | |
|  | | Centres responded (N = 145) |
| Community hospital | | 33 |
| Teaching hospital | | 108 |
| Number of hospital beds | | 600 [400 – 960] |
| Number of ICU beds | | 20 [11 – 35] |
| Number of operating theatres | | 15 [9 -22] |
| Staff (anaesthesiologists) | | 25 [12 – 40] |
| Invasive mechanical ventilation for surgery per week | | 103 [60 – 200] |
| Surgical procedures | | |
| Abdominal surgery | 135 (93%) |
| Bariatric surgery | 66 (46%) |
| Cardiothoracic surgery | 71 (49%) |
| Endocrine surgery | 88 (61%) |
| Eye surgery | 97 (67%) |
| General surgery | 132 (91%) |
| Gynaecological surgery | 126 (87%) |
| Interventional neuroradiology | 56 (39%) |
| Neurosurgery | 82 (57%) |
| Oral and maxillofacial surgery | 96 (62%) |
| Orthopaedic surgery | 121 (83%) |
| Plastic surgery | 91 (63%) |
| Surgical oncology | 107 (74%) |
| Trauma surgery | 111 (77%) |
| Urology | 121 (83%) |
| Vascular surgery | 109 (75%) |
| Data are presented as median [QR] or N (%). One participating centre did not respond; ICU: intensive care unit | | |

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| **Table S4. Definition of recruitment manoeuvres** |  |
| **Type of recruitment manoeuvre** | **Definition** |
| Bag squeezing | Sustained manual hyperinflation using balloon/bag |
| Ventilator | Transient stepwise increase in positive end expiratory pressure (PEEP) at constant tidal volume or transient stepwise increase in tidal volume at constant PEEP or inspiratory holds (continuous positive airway pressure (CPAP) applied for a fixed time) or any combination of the previous three |
| Rescue recruitment manoeuvre | Bag-squeezing or ventilator recruitment manoeuvre, and “unplanned recruitment manoeuvre” reported as intraoperative complication |

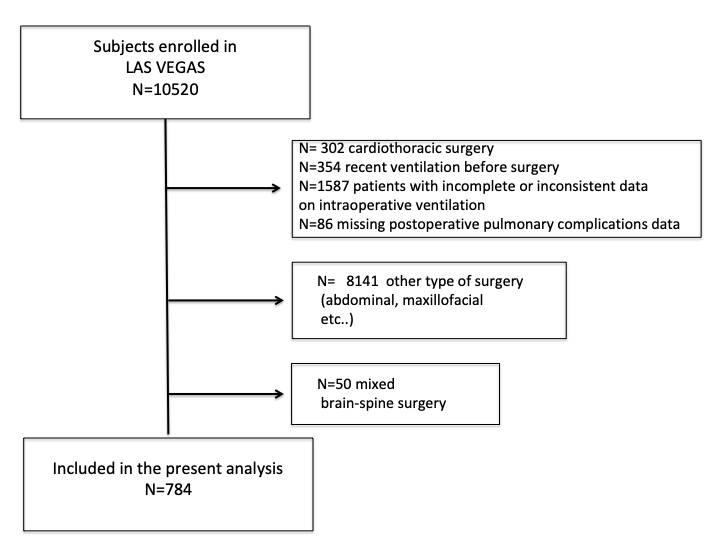
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| **Table S5. Definition of post-operative pulmonary complications (PPCs). Severe PPCs were defined as complications 2-5** | |
| **Single PPC** | **Definition** |
| 1.Unplanned need for oxygen therapy | Supplemental O2 therapy administered to correct hypoxemia, defined as SpO2 < 90% in room air or PaO2 < 60 mmHg. This excludes oxygen administration given as a part of standard care, such as routine oxygen administration at the arrival in the PACU |
| 2.Respiratory failure | SpO2 < 90% in room air or PaO2 < 60 mmHg with oxygen therapy, or need for non-invasive mechanical ventilation |
| 3.Mechanical ventilation | Need for new invasive ventilation after surgery, or unexpected prolonged invasive ventilation after discharge from the operating room |
| 4.Acute Distress Respiratory Syndrome | According to the Berlin definition |
| Pneumonia | Lung infiltrates at the chest X-ray or Computed Tomography, plus at least two among the following three criteria: fever > 38°C (100.4 °F), leucocytosis or leukopenia (WBC count > 12000 or <4000 cells/mm3), purulent secretions |
| 5.Pneumothorax | Air in the pleural space without blood presence, as confirmed by chest X-ray |

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| **Table S6. Definition of intraoperative complications** | |
| Desaturation | Oxygen saturation, SpO2 < 92% |
| Need for rescue recruitment manoeuvre | Ventilation strategies aimed at restoring aeration of the lungs |
| Need for ventilatory pressure reduction | Ventilation strategies aimed at lowering peak and/or plateau pressure |
| New onset of expiratory flow limitation | End-expiration expiratory flow higher than zero at the visual analysis of the flow curve |
| Hypotension | Systolic arterial pressure < 90 mmHg for at least 3 minutes |
| Need for vasoactive drugs | Use of vasoactive drugs to correct hypotension as previously defined |
| Arrhythmia | Defined as any new onset of atrial fibrillation, sustained ventricular tachycardia, supraventricular tachycardia, or ventricular fibrillation |

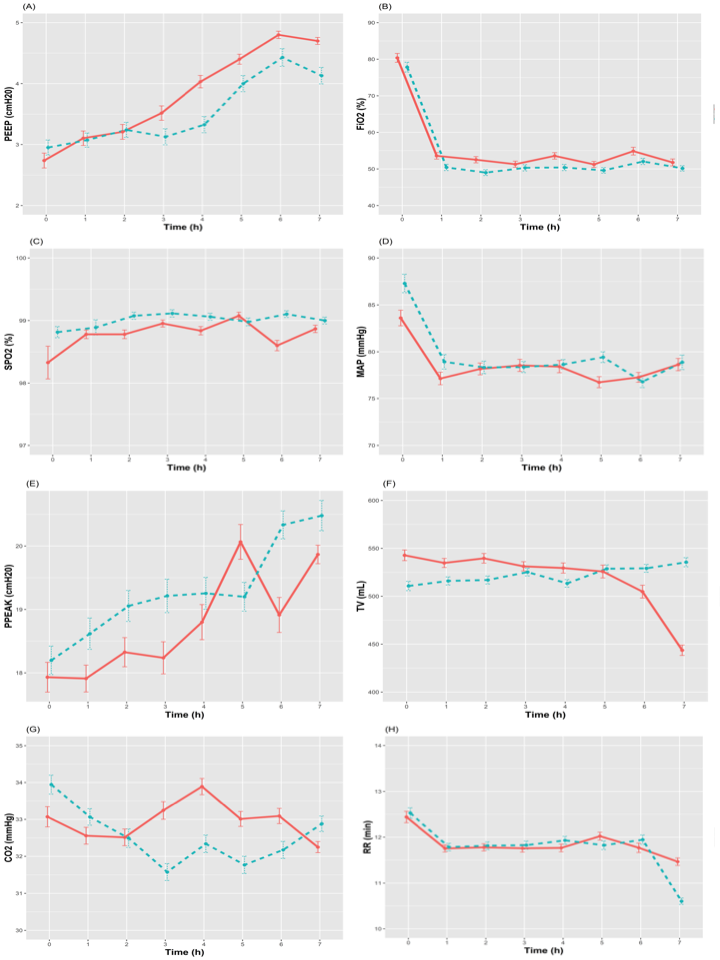
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| **Univariate models** | | | | |
| **Variables** | **OR** | **95% CIs** | | **P-value** |
| **lower bound** | **upper bound** |
| Age, per 10 years | 1.345 | 1.174 | 1.539 | 0.000 |
| Gender | 1.238 | 0.780 | 1.964 | 0.364 |
| BMI, per 5 kg/height2 | 1.147 | 0.943 | 1.395 | 0.169 |
| ASA, per 1 unit | 1.818 | 1.302 | 2.539 | 0.000 |
| Smoker | 0.979 | 0.610 | 1.570 | 0.929 |
| COPD | 1.846 | 0.784 | 4.348 | 0.161 |
| Duration of anaesthesia, per 120 min | 1.452 | 1.196 | 1.762 | 0.000 |
| Respiratory infection <30 days | 1.032 | 0.338 | 3.153 | 0.955 |
| Total fluids, per 1000 ml | 1.264 | 1.088 | 1.469 | 0.002 |
|  | | | | |
| **Intraoperative complications** | | | | |
| Desaturation | 4.043 | 1.303 | 12.550 | 0.016 |
| Hypotension | 1.371 | 0.904 | 2.080 | 0.037 |
| Use of vasoactive drugs | 1.982 | 0.922 | 4.261 | 0.080 |
| Rescue Recruitment Manoeuvres Ventilator | 2.337 | 0.661 | 8.262 | 0.188 |
|  | | | | |
| **Ventilatory parameters** | | | | |
| Driving pressure, per 5 cmH2O | 1.014 | 0.713 | 1.441 | 0.940 |
| PEEP, per 1 cmH2O | 1.067 | 0.849 | 1.340 | 0.580 |
| Tidal Volume mL/kg PBW | 0.959 | 0.905 | 1.016 | 0.159 |
| Peak Pressure | 1.139 | 0.821 | 1.580 | 0.437 |
| FiO2 | 1.008 | 0.994 | 1.023 | 0.257 |
| Flow limitation | 2.991 | 0.377 | 23.709 | 0.300 |
| Routine Recruitment Manoeuvres Ventilator | 1.383 | 0.573 | 3.338 | 0.471 |
| Type of neurosurgery | 1.500 | 0.871 | 2.585 | 0.144 |
| ARISCAT risk score, per 1 unit | 1.037 | 1.020 | 1.053 | 0.000 |
| ARISCAT risk score ≥ 26 | 2.661 | 1.674 | 4.230 | 0.000 |
|  |  |  |  |  |
| **Multivariate model** | | | | |
| **Predictors** | **OR** | **95% CIs** | | **P-value** |
| **lower bound** | **upper bound** |
| Duration of anaesthesia, per 120 min | 1.295 | 1.067 | 1.572 | 0.009 |
| Desaturation | 3.115 | 0.933 | 10.407 | 0.065 |
| Hypotension | 3.014 | 0.912 | 10.313 | 0.085 |
| ARISCAT risk score ≥ 26 | 1.675 | 0.978 | 2.869 | 0.060 |
| Type of Neurosurgical procedure | 2.759 | 1.216 | 6.260 | 0.115 |
| Age | 0.244 | 0.000 | 1197.249 | 0.745 |
| Age according to type of Neurosurgical procedure | 0.000 | 0.000 | 0.189 | 0.031 |

**Table S7.** Univariate and multivariate logistic regression for the correlation of general intraoperative complications and ventilator parameters and the development of post pulmonary complications. Abbreviations: BMI, Body mass index; ASA, American Society of Anesthesiologists; COPD, chronic obstructive pulmonary disease; PEEP, positive end expiratory pressure; PBW, predicted body weight; FiO2, Fraction of inspired oxygen; OR, odds ratio; CI, confidence interval.

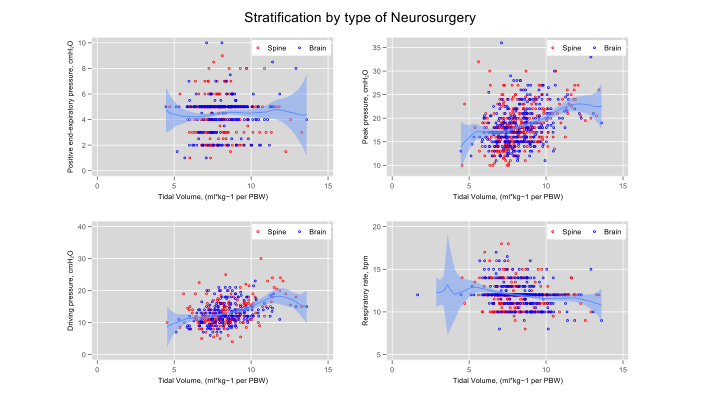
ESM. Flowchart

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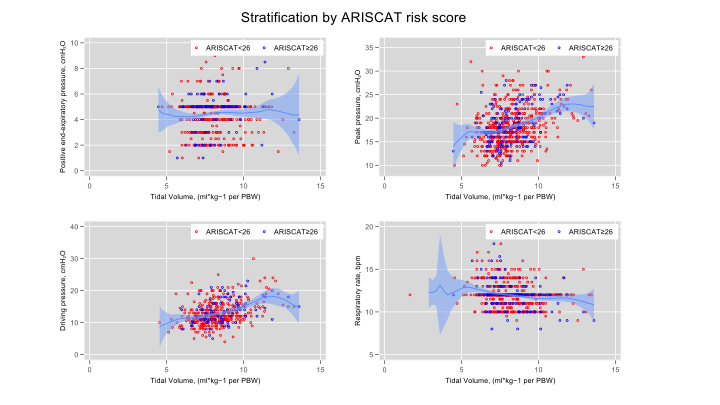
**Figure S1**. Settings of different hourly intraoperative factors over time. A, Positive End Expiratory Pressure (PEEP); B, inspired Fraction of Oxygen (FiO2); C, Oxygen saturation (SpO2); D, mean arterial pressure (MAP); E, Peak pressure (Ppeak); F, Tidal Volume (VT); G, carbon dioxide (CO2); H, respiratory rate (RR). T0 represents the induction of general anaesthesia. Continuous line represents the spine group and dashed line represents the brain group.

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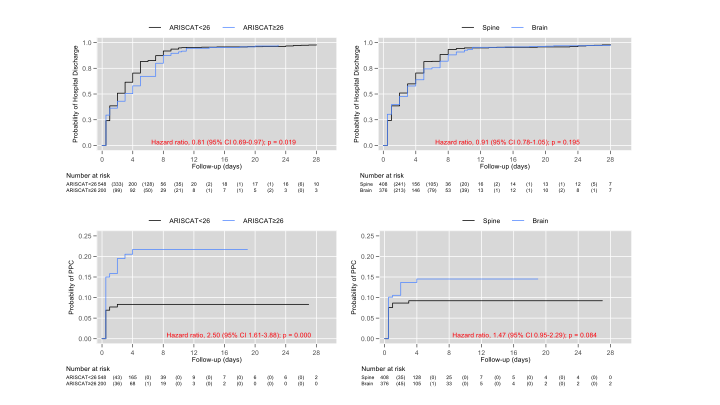
**Figure S2. Combinations of ventilator settings in patients undergoing brain or spine surgery.** Scatterplots showing distribution of tidal volume with positive end expiratory pressure combinations (upper left panel); tidal volume with Peak pressure (upper right panel); tidal volume with Driving pressure (lower left panel); tidal volume and respiratory rate (lower right panel). Scatter and the fitted line for each of the bivariate plots are shown in blue

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**Figure S3.Combinations of ventilator settings in patients with ARISCAT<26 and ARISCAT** ≥26**.** Scatterplots showing distribution of tidal volume with positive end expiratory pressure combinations (upper left panel); tidal volume with Peak pressure (upper right panel); tidal volume with Driving pressure (lower left panel); tidal volume and respiratory rate (lower right panel). Scatter and the fitted line for each of the bivariate plots are shown in blue

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**Figure S4.** Kaplan-Meier plot for probability of hospital discharge and the occurrence of PPC over time for neurosurgical patients, stratified according to the type of surgery, and ARISCAT score. Test of equality Log Rank (Mantel-Cox) shows no statistical difference on length of stay and PPC occurrence between the type of surgery, but significant difference between patients with ARISCAT < 26 and ≥ 26.



**Figure S5.** Interaction between type of neurosurgery and age continuous on PPC as outcome. This figure shows the delta log-odds - Brain minus spine surgery - per 1-unit change in age. Analysis adjusted by duration of anesthesia, desaturation, and ARISCAT risk score. By looking at the portion of the lower CI bound above the 0-line, we can conclude that the effect of age on PPC only becomes significant at age above 62. No effect between the two types of surgery was demonstrated below age 62.

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