

GiViTI

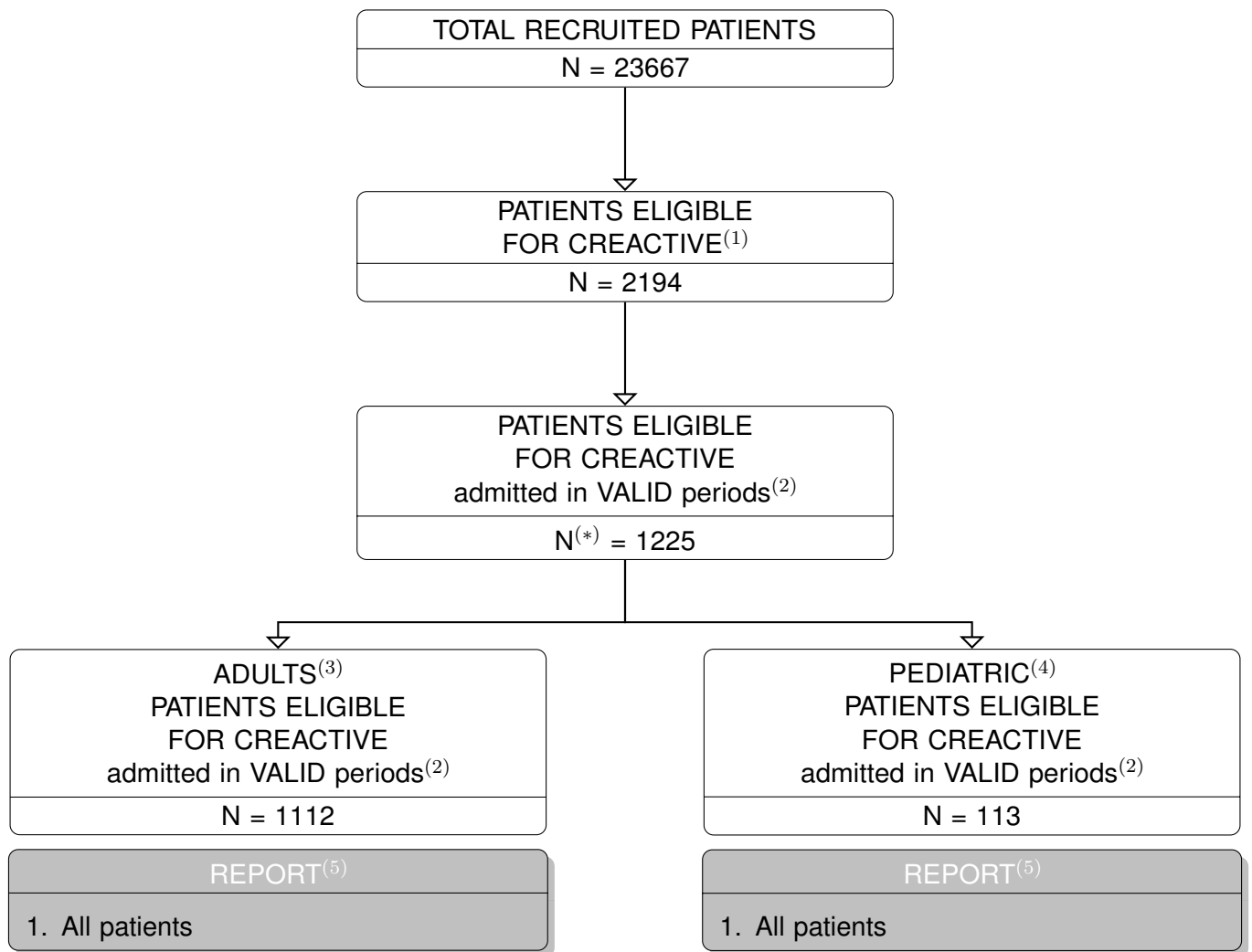
Gruppo Italiano per la Valutazione degli Interventi In Terapia Intensiva

**Report
CREACTIVE project**

Year 2014

General report (48 ICUs)

Overall population (84 ICUs) - Year 2014
Study flow-chart



(1) Patients with traumatic brain injury (maxillofacial fracture alone does not enable the petal) are eligible for CREACTIVE.

(2) Periods are considered VALID when the % of complete data for core and petal are over the thresholds.

(3) Patients older than 17 years are considered ADULT.

(4) Patients under 17 years old are considered PEDIATRIC patients.

(5) Statistics are presented only for categories of patients represented by at least 5 subjects.

(*) From 48 ICU: 42 ITALY, 3 SLOVENIA, 1 CYPRUS, 1 HUNGARY e 1 ISRAEL.

General report - Year 2014

Characteristics on admission - Adult patients

Patients (N): 1112

Sex	N	%
Male	790	71.0
Female	322	29.0
Missing	0	

Age (years)	N	%
17-45	380	34.2
46-65	277	24.9
66-75	178	16.0
>75	277	24.9
Missing	0	
Mean	56.0	
SD	21.5	
Median	58	
Q1–Q3	38–75	
Min–Max	17–94	

Body mass Index (BMI)	N	%
Underweight	32	2.9
Normal	604	55.0
Overweight	382	34.8
Obese	81	7.4
Missing	13	

Pregnancy status	N	%
Females (N=322)		
Not fertile	147	46.2
Not pregnant/Unknown	171	53.8
Currently pregnant	0	0.0
Post partum	0	0.0
Missing	4	

Comorbidities	N	%
No	561	50.4
Yes	551	49.6
Missing	0	

Comorbidities (top 10)	N	%
Hypertension	335	30.1
Arrhythmia	114	10.3
Cerebrovascular disease	94	8.5
Diabetes Type II without insulin tr.	84	7.6
Antiplatelet therapy	76	6.8
Drug-induced coagulopathy	66	5.9
Myocardial infarction	58	5.2
NYHA class II-III	44	4.0
Moderate COPD	38	3.4
Any tumour without metastasis	37	3.3
Missing	0	

Stay before ICU (days)	N	%
Mean	0.6	
SD	3.1	
Median	0	
Q1–Q3	0–1	
Missing	0	

Source of admission	N	%
Same hospital	896	80.6
Other hospital	216	19.4
Long-term chronic care hospital	0	0.0
Directly from the community (e.g., ambulance, home, ...)	0	0.0
Missing	0	

Ward of admission	N	%
Same hospital (N=896)		
Medical ward	19	2.1
Surgical ward	133	14.8
Emergency room	702	78.3
Other ICU	34	3.8
High dependency care unit	8	0.9
Missing	0	

Ward of admission	N	%
Other hospital (N=216)		
Medical ward	3	1.4
Surgical ward	3	1.4
Emergency room	153	70.8
Other ICU	55	25.5
High dependency care unit	2	0.9
Missing	0	

Reason for transfer from	N	%
Other ICU (N=89)		
Specialist expertise	39	43.8
Step-up care	26	29.2
Logistical/organizational reasons	21	23.6
Step-down care	3	3.4
Missing	0	

Access type °	N	%
Primary	617	70.2
Secondary	262	29.8
Missing	233	

° The information is not required in the data collection form. Thus, the data is obtained on the basis of the number of hours between TBI and hospital admission.

General report - Year 2014**Timing of entry in TI - Adult patients**

Available hour of trauma	N	%
No	153	13.8
Yes	952	86.2
Missing	7	

Hours between trauma and admission in ICU*Available hour of trauma (N=952)*

Mean	12.0
SD	23.6
Median	5
Q1–Q3	3–9
Min–Max	0–180
Missing	4

Hours between trauma and admission in ICU*Available hour of trauma - Same hospital (N=791)*

Mean	11.0
SD	21.6
Median	4
Q1–Q3	2–8
Min–Max	0–180
Missing	3

Hours between trauma and admission in ICU*Available hour of trauma - Other hospital (N=161)*

Mean	16.9
SD	31.4
Median	5
Q1–Q3	4–9
Min–Max	0–175
Missing	1

Hours between trauma and admission in ICU*Available hour of trauma - Same hospital - Emergency room (N=633)*

Mean	7.1
SD	12.5
Median	4
Q1–Q3	2–6.5
Min–Max	0–144
Missing	2

Hours between trauma and admission in ICU*Available hour of trauma - Other hospital - Emergency room (N=116)*

Mean	8.6
SD	17.7
Median	5
Q1–Q3	4–7
Min–Max	0–141
Missing	0

General report - Year 2014

Characteristics of the trauma - Adult patients

Type of traumatic brain injury	N	%
Penetrating	17	1.5
Crush	42	3.8
Blast	4	0.4
Closed	1042	94.3
Unknown	0	0.0
Missing	7	

Workplace accident	N	%
No	978	88.5
Yes	89	8.1
Unknown	38	3.4
Missing	7	

Intention	N	%
Accidental	1024	92.7
Self-inflicted injury	25	2.3
Violence	24	2.2
Other	3	0.3
Unknown	29	2.6
Missing	7	

Trauma Dynamics	N	%
Traffic accident	529	47.9
Gunshot	11	1.0
Weapon	2	0.2
Blunt object	32	2.9
Low energy fall	364	32.9
High energy fall	129	11.7
Other	18	1.6
Unknown	20	1.8
Missing	7	

Place	N	%
Public place	727	65.8
Sports / Recreation	38	3.4
Home	316	28.6
Unknown	24	2.2
Missing	7	

General report - Year 2014

Type of trauma - Adult patients

Type of lesion °	N	Alone	With G	With H	With G+H
Diffuse Injury *	112	51	27	17	17
Focal Damage **	876	383	163	164	166
G: Traumatic subarachnoid haemorrhage	478	85	/	20	/
H: Skull fracture	403	19	20	/	/

Marshall Classification	N	%
Diffuse Injury I (no visible pathology)	62	6.3
(D-II) Diffuse injury II	365	37.1
Diffuse Injury III (edema)	96	9.8
Diffuse Injury IV (shift>5mm)	36	3.7
(5-EML) Evacuated mass lesion	325	33.1
Cerebral contusion/laceration	32	9.8
Extradural/epidural haematoma	55	16.9
Traumatic Subdural haematoma	206	63.4
Traumatic intraparenchymal bleeding	32	9.8
(6-NEML) Not Evacuated mass lesion	99	10.1
Cerebral contusion/laceration	27	27.3
Extradural/epidural haematoma	9	9.1
Traumatic Subdural haematoma	45	45.5
Traumatic intraparenchymal bleeding	18	18.2
Missing	129	

Prevalent lesion: DIFFUSE INJURY (N): 112

Diffuse injury	N	Alone	With G	With H	With G+H
A: Traumatic diffuse injury without oedema	58	34	17	3	4
B: Traumatic diffuse injury with oedema	54	17	10	14	13

Petechiae	N	%	Midline shift>5 mm	N	%	Cistern conditions	N	%
No	37	33.0	No	96	85.7	Normal	76	67.9
Yes	75	67.0	Yes	16	14.3	Compressed or distorted	16	14.3
Missing	0		Missing	0		Absent	20	17.9
						Missing	0	

Presence of focal damage	N	%
No	76	67.9
Yes	36	32.1
Missing	0	

Focal lesion	N	%
Presence of focal damage (N=36)		
Traumatic subdural hematoma	12	33.3
Extradural or epidural hematoma	3	8.3
Contusion and/ or brain laceration	18	50.0
Traumatic intraparenchymal hemorrhage	3	8.3
Missing	0	

Lesion volume > 25ml	N	%	Evacuated mass	N	%
(N=36)			(N=36)		
No	28	77.8	No	31	86.1
Yes	8	22.2	Yes	5	13.9
Missing	0		Missing	0	

° diffuse injury and focal damage are mutually exclusive. In case of coexistence clinician has to choose and indicate the prevalent damage.

* Traumatic diffuse injury without oedema, Traumatic diffuse injury with oedema.

** Cerebral contusion/laceration, Extradural/epidural haematoma, Traumatic Subdural haematoma, Traumatic intraparenchymal bleeding.

General report - Year 2014

Type of trauma - Adult patients

Prevalent lesion: FOCAL DAMAGE (N): 876

Focal damage	N	Alone	With G	With H	With G+H
C: Cerebral contusion/laceration	300	120	59	60	61
D: Extradural/epidural haematoma	96	39	7	33	17
E: Traumatic Subdural haematoma	390	182	80	62	66
F: Traumatic intraparenchymal bleeding	90	42	17	9	22

Lesion volume > 25ml	N	%
No	534	61.3
Yes	337	38.7
Missing	5	

Evacuated mass	N	%
No	551	63.3
Yes	320	36.7
Missing	5	

Petechiae	N	%
No	524	60.2
Yes	347	39.8
Missing	5	

Midline shift > 5 mm	N	%
No	535	61.4
Yes	336	38.6
Missing	5	

Cistern conditions	N	%
Normal	466	53.5
Compressed or distorted	346	39.7
Absent	59	6.8
Missing	5	

FOCAL DAMAGE (prevalent or compresent) (N): 912

Lesion volume > 25ml	N	%
No	562	62.0
Yes	345	38.0
Missing	5	

Evacuated mass	N	%
No	582	64.2
Yes	325	35.8
Missing	5	

Midline shift > 5 mm	N	%
No	561	61.9
Yes	346	38.1
Missing	5	

Cistern conditions	N	%
Normal	485	53.5
Compressed or distorted	354	39.0
Absent	68	7.5
Missing	5	

FOCAL DAMAGE (prevalent o compresent) with evacuated mass (N): 325

Lesion volume > 25ml	N	%
No	79	24.3
Yes	246	75.7
Missing	0	

Midline shift > 5 mm	N	%
No	79	24.3
Yes	246	75.7
Missing	0	

Cistern conditions	N	%
Normal	88	27.1
Compressed or distorted	214	65.8
Absent	23	7.1
Missing	0	

FOCAL DAMAGE (prevalent o compresent) without evacuated mass (N): 582

Lesion volume > 25ml	N	%
No	483	83.0
Yes	99	17.0
Missing	0	

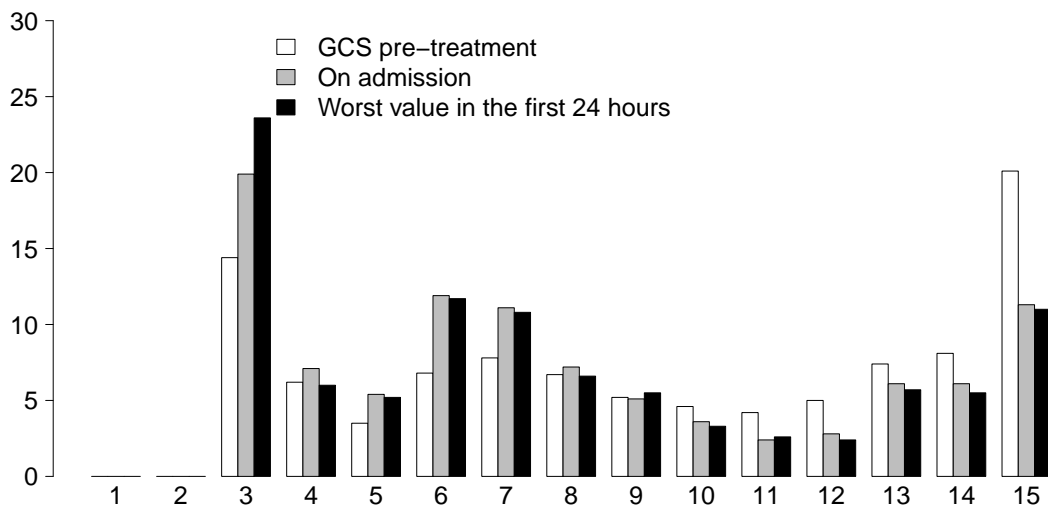
Midline shift > 5 mm	N	%
No	482	82.8
Yes	100	17.2
Missing	0	

Cistern conditions	N	%
Normal	397	68.2
Compressed or distorted	140	24.1
Absent	45	7.7
Missing	0	

General report - Year 2014

Glasgow Coma Scale - Adult patients

Glasgow Coma Scale (%)



GCS pre-treatment

Median	9
Q1-Q3	6-14
Missing	7

GCS (admission)

Median	7
Q1-Q3	4-12
Not evaluable	254
Missing	0

GCS worst (first 24 hours)

Median	7
Q1-Q3	4-11
Not evaluable	252
Missing	0

GCS	GCSPre(N)	GCSPre(%)	GCSAdm(N)	GCSAdm(%)	GCSWorst24(N)	GCSWorst24(%)
3	159	14.4	171	19.9	203	23.6
4	69	6.2	61	7.1	52	6
5	39	3.5	46	5.4	45	5.2
6	75	6.8	102	11.9	101	11.7
7	86	7.8	95	11.1	93	10.8
8	74	6.7	62	7.2	57	6.6
9	58	5.2	44	5.1	47	5.5
10	51	4.6	31	3.6	28	3.3
11	46	4.2	21	2.4	22	2.6
12	55	5	24	2.8	21	2.4
13	82	7.4	52	6.1	49	5.7
14	89	8.1	52	6.1	47	5.5
15	222	20.1	97	11.3	95	11
Tot	1105	100	858	100	860	100
3-8					551	64.1
9-13					167	19.4
14-15					142	16.5

Worst GCS during first 24h: best motor response	N	%
Obeys commands (6)	222	20.0
Localizes pain (5)	235	21.1
Withdraws to pain (4)	134	12.1
Flexion (abnormal) to pain (3)	54	4.9
Extension to pain (2)	63	5.7
None(1)	238	21.4
Not available	166	14.9
Missing	0	

GCS trend	N	%
Available information (N=901)		
GCS 3 stable	87	9.7
GCS from 3 to 4-8	23	2.6
GCS from 3 to > 8	14	1.6
GCS from 4-8 to 3	58	6.4
GCS 4-8 stable	143	15.9
GCS from 4-8 to > 8	71	7.9
GCS from > 8 to 3	32	3.6
GCS from > 8 to 4-8	137	15.2
GCS > 8 stable	336	37.3
Missing	0	

General report - Year 2014

Before admission to ICU - Adult patients

Availability measure systolic blood pressure pre ICU	N	%
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No	375	33.9
Yes	730	66.1
Missing	7	

Clinically relevant hypotension	N	%
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No	179	16.2
Yes	909	82.3
Not available	17	1.5
Missing	7	

Value (the lowest) of systolic blood pressure		
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Mean	117.0
SD	35.3
Median	120
Q1–Q3	99–140
Min–Max	20–250
Missing	0

Availability measure Hypoxia pre ICU	N	%
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No	402	36.4
Yes	703	63.6
Missing	7	

Clinically relevant hypoxia	N	%
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No	261	23.6
Yes	822	74.5
Not available	21	1.9
Missing	8	

Value (the lowest) to peripheral oxygen saturation		
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Mean	92.7
SD	12.4
Median	96
Q1–Q3	91–99
Min–Max	10–100
Missing	0

Pupils in the emergency room		
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GCS pre < 15 (N=883)	N	%
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Bilaterally reactive and/or miotic	622	70.5
Unilaterally dilated and non-reactive	147	16.7
Bilaterally dilated and non-reactive	100	11.3
Not assessable	3	0.3
Not available	10	1.1
Missing	1	

Hemoglobin ER (gr/dl)		
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Mean	12.2
SD	2.5
Median	12.5
Q1–Q3	10.8–14
Min–Max	1.2–20
Not available	103
Missing	8

Blood glucose at ER (mg/dl)		
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Mean	159.3
SD	63.8
Median	148
Q1–Q3	120–183
Min–Max	7–500
Not available	144
Missing	8

General report - Year 2014

Complications in the ICU - Adult patients

Neurological complications during the stay	N	%
No	611	55.2
Yes	495	44.8
A: Intracranial hypertension	215	19.4
B: Intracranial hypertension refractory or intractable	187	16.9
C: At least one episode of dilated pupils unreactive to light	230	20.8
D: Reduction of serum sodium	112	10.1
E: Post-surgical intracranial bleeding	9	0.8
F: Non-surgical intracranial bleeding	9	0.8
G: Seizures	44	4.0
H: Brain edema	81	7.3
I: Drowsiness/agitation/delirium	101	9.1
Missing	6	

Neurological complications during the stay (top 10)	N	%
C	82	7.4
I	74	6.7
ABC	65	5.9
D	54	4.9
AB	31	2.8
ABCH	29	2.6
G	24	2.2
ABCD	13	1.2
ABD	12	1.1
A	11	1.0
Missing	6	

Other complications during the stay	N	%
Respiratory	137	12.3
Pleural effusion	74	6.7
Atelectasis	55	4.9
Pneumothorax/Pneumomediastinum	22	2.0
Aspiration pneumonia	9	0.8
Pulmonary embolism	8	0.7
Cardiovascular	104	9.4
Deep venous thrombosis	33	3.0
Acute severe arrhythmia: tachycardias	32	2.9
Cardiac arrest	23	2.1
Acute severe arrhythmia: bradycardias	8	0.7
Hypertensive crisis	6	0.5
Gastrointestinal and hepatic	15	1.3
Paralytic Ileus	6	0.5
Gastrointestinal bleeding: upper tract	4	0.4
Acute bile-duct disease	2	0.2
Gastrointestinal perforation	2	0.2
Intrabdominal bleeding	2	0.2
Other	57	5.1
Metabolic disorder	36	3.2
Other skin and/or soft tissue pathology	11	1.0
Other disease	8	0.7
Nephro-urologic disease	4	0.4
Extremity compartment syndrome (severe)	3	0.3
Blunt cerebral vessels trauma	1	0.1
Fat embolism	1	0.1
Infections	373	33.5
Pneumonia	195	17.5
L.R.T.I. other than pneumonia	87	7.8
NON-surgical urinary tract infection	52	4.7
Catheter-related bacteremia (CR-BSI)	30	2.7
Primary bacteraemia of unknown origin	28	2.5
Upper respiratory tract infection	19	1.7
F.U.O. fever of unknown origin	14	1.3
Post-surgical skin/soft tissue infection	13	1.2
Clinical sepsis	10	0.9
NON-surgical skin/soft tissue infection	5	0.4
Missing	0	

General report - Year 2014
Therapy in ICU - Adult patients

Neurosurgical operation	N	%
Primary decompressive craniectomy	121	11.0
Secondary decompressive craniectomy	30	2.7
No decompressive craniectomy	953	86.3
Missing	8	

Hypothermia	N	%
Yes	25	2.2
No	1087	97.8
Missing	0	

External ventricular drainage without ICP monitoring	N	%
Yes	7	0.6
No	1105	99.4
Missing	0	

External ventricular drainage with ICP monitoring	N	%
Yes	44	4.0
No	1068	96.0
Missing	0	

Barbiturate infusion for refractory ICP	N	%
Yes	59	5.3
No	1045	94.7
Missing	8	

Hyperventilation paCO₂<25 mmHg	N	%
Yes	96	8.7
No	1008	91.3
Missing	8	

Indomethacin	N	%
Yes	8	0.7
No	1096	99.3
Missing	8	

Mannitol (multiple doses)	N	%
Yes	333	30.2
No	771	69.8
Missing	8	

Hypertonic saline	N	%
Yes	146	13.2
No	958	86.8
Missing	8	

Sedation/analgesia	N	%
Yes	876	79.3
No	228	20.7
Missing	8	

Propofol infusion for refractory ICP	N	%
Yes	209	18.9
No	895	81.1
Missing	8	

Vasoconstrictor drugs	N	%
Vasoactive drugs in Core (N=536)	N	%
Yes	436	82.1
No	95	17.9
Missing	5	

General report - Year 2014

Outcome - Adult patients

ICU stay (days)

Mean	10.8
SD	12.4
Median	7
Q1–Q3	2–16
Min–Max	1–179
Missing	0

ICU mortality

	N	%
Alive	848	76.3
Dead	264	23.7
Missing	0	

Brain death assessment

Dead (N=264)	N	%
Yes, with organ donation	49	20.9
Yes, without organ donation	28	12.0
No	157	67.1
Missing	30	

Organ/Tissue removal

(N=49)	N	%
No removal	2	4.1
Only organ removal	22	44.9
Only tissue removal	6	12.2
Organ and tissue removal	19	38.8
Missing	0	

Hospital stay (days) *

Mean	20.1
SD	23.9
Median	14
Q1–Q3	6–26
Min–Max	0–238
Missing	2

Hospital mortality

	N	%
Alive	808	72.9
Dead	300	27.1
Missing	2	

Cause of death

Dead (N=287)	N	%
MOF	50	17.8
Comorbidities	24	8.5
Cerebral	177	63.0
Hemorrhagic	23	8.2
Not determined	7	2.5
Missing	6	

Outcome at discharge from hospital

Alive (N=825)	N	%
Cannot follow simple commands	194	23.6
Can follow simple commands	627	76.4
Missing	4	

Last hospital mortality

	N	%
Alive	783	70.7
Dead	324	29.3
Missing	3	

* Days between admission in ICU and discharge from hospital.

General report - Year 2014

Mortality for main subgroups of patients - Adult patients

Age (years)	N	%	†	‡
17-45	380	34.2	13.4	14.8
46-65	277	24.9	18.8	22.2
66-75	178	16.0	27.5	34.3
>75	277	24.9	40.4	52.7
Missing	0			

Comorbidities	N	%	†	‡
No	561	50.4	17.5	19.2
Yes	551	49.6	30.1	39.4
Missing	0			

Source of admission	N	%	†	‡
Same hospital	896	80.6	24.0	29.6
Other hospital	216	19.4	22.7	27.8
Long-term chronic care hospital	0	0.0		
Directly from the community (e.g., ambulance, home, ...)	0	0.0		
Missing	0			

Type of traumatic brain injury	N	%	†	‡
Penetrating	17	1.5	58.8	58.8
Crush	42	3.8	38.1	42.9
Blast	4	0.4	50.0	50.0
Closed	1042	94.3	22.2	27.8
Unknown	0	0.0		
Missing	7			

GCS worst (first 24 hours)	N	%	†	‡
3-8	551	49.6	38.5	45.3
9-13	167	15.0	7.2	12.0
14-15	142	12.8	0.0	2.1
Not evaluable	252	22.7	15.9	20.7
Missing	0			

Worst GCS during first 24h: best motor response	N	%	†	‡
Obeys commands (6)	222	20.0	1.4	3.2
Localizes pain (5)	235	21.1	10.2	14.9
Withdraws to pain (4)	134	12.1	22.4	29.9
Flexion (abnormal) to pain (3)	54	4.9	35.2	50.0
Extension to pain (2)	63	5.7	31.7	42.9
None(1)	238	21.4	61.8	66.7
Not available	166	14.9	12.7	18.1
Missing	0			

GCS trend	N	%	†	‡
Available information (N=901)				
GCS 3 stable	87	9.7	73.6	80.2
GCS from 3 to 4-8	23	2.6	21.7	26.1
GCS from 3 to > 8	14	1.6	0.0	0.0
GCS from 4-8 to 3	58	6.4	72.4	75.9
GCS 4-8 stable	143	15.9	19.6	28.7
GCS from 4-8 to > 8	71	7.9	1.4	7.0
GCS from > 8 to 3	32	3.6	59.4	62.5
GCS from > 8 to 4-8	137	15.2	35.0	43.1
GCS > 8 stable	336	37.3	4.5	8.4
Missing	0			

Clinically relevant hypotension	N	%	†	‡
No	179	16.2	45.8	47.8
Yes	909	82.3	18.6	24.8
Not available	17	1.5	47.1	52.9
Missing	7			

Clinically relevant hypoxia	N	%	†	‡
No	261	23.6	29.9	35.1
Yes	822	74.5	20.9	26.6
Not available	21	1.9	38.1	42.9
Missing	8			

Pupils in the emergency room	N	%	†	‡
GCS pre < 15 (N=883)				
Bilaterally reactive and/or miotic	622	70.5	15.0	20.4
Unilaterally dilated and non-reactive	147	16.7	32.7	40.8
Bilaterally dilated and non-reactive	100	11.3	76.0	80.0
Not assessable	3	0.3	33.3	33.3
Not available	10	1.1	30.0	30.0
Missing	1			

Marshall Classification	N	%	†	‡
Diffuse Injury I (no visible pathology)	62	6.3	9.7	11.3
(D-II) Diffuse injury II	365	37.1	10.4	12.9
Diffuse Injury III (edema)	96	9.8	37.5	44.7
Diffuse Injury IV (shift>5mm)	36	3.7	44.4	52.8
(5-EML) Evacuated mass lesion	325	33.1	25.5	32.9
(6-NEML) Not Evacuated mass lesion	99	10.1	68.7	79.8
Missing	129			

† ICU mortality (%)

‡ Last hospital mortality (%)

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Characteristics on admission - Pediatric patients

Patients (N): 113

Sex	N	%
Male	79	69.9
Female	34	30.1
Missing	0	

Age	N	%
Newborn (0-4 weeks)	0	0.0
1-6 months	4	3.6
6-12 months	4	3.6
12-24 months	14	12.6
2-4 years	15	13.5
5-8 years	22	19.8
9-16 years	52	46.8
Missing	2	
Mean	8.2	
SD	5.6	
Median	8	
Q1–Q3	3–14	
Min–Max	0–16	

Weight (kg) Newborns (N=0)	N	%
Mean		
SD		
Median		
Q1–Q3		
Missing	0	

Gestational age Newborns (N=0)	N	%
At term	0	0.0
Not at term	0	0.0
Missing	0	

Comorbidities	N	%
No	107	94.7
Yes	6	5.3
Missing	0	

Comorbidities (top 10)	N	%
Asthma	3	2.7
Chromosomal anomalies	1	0.9
Coagulation disorder	1	0.9
Encephalopathy	1	0.9
Genetic diseases	1	0.9
Myopathy	1	0.9
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

Previous ICU admissions	N	%
None	102	90.3
≤2	1	0.9
>2	0	0.0
Unknown	10	8.8
Missing	0	

Stay before ICU (days)	Mean	SD	Median	Q1–Q3	Missing
	0.2	0.6	0	0–0	0

Source of admission	N	%
Same hospital	91	80.5
Other hospital	17	15.0
Long-term chronic care hospital	0	0.0
Directly from the community (e.g., ambulance, home, ...)	5	4.4
Missing	0	

Ward of admission Same hospital (N=91)	N	%
Medical ward	2	2.2
Surgical ward	6	6.6
Emergency room	83	91.2
Other ICU	0	0.0
High dependency care unit	0	0.0
Missing	0	

Ward of admission Other hospital (N=17)	N	%
Medical ward	0	0.0
Surgical ward	0	0.0
Emergency room	17	100.0
Other ICU	0	0.0
High dependency care unit	0	0.0
Missing	0	

Reason for transfer from Other ICU (N=0)	N	%
Specialist expertise	0	0.0
Step-up care	0	0.0
Logistical/organizational reasons	0	0.0
Step-down care	0	0.0
Missing	0	

Access type °	N	%
Primary	73	79.3
Secondary	19	20.7
Missing	21	

° The information is not required in the data collection form. Thus, the data is obtained on the basis of the number of hours between TBI and hospital admission.

General report - Year 2014**Timing of entry in TI - Pediatric patients**

Available hour of trauma	N	%
No	20	17.9
Yes	92	82.1
Missing	1	

Hours between trauma and admission in ICU*Available hour of trauma (N=92)*

Mean	5.7
SD	12.7
Median	3
Q1–Q3	2–5
Min–Max	0–116
Missing	0

Hours between trauma and admission in ICU*Available hour of trauma - Same hospital (N=74)*

Mean	5.2
SD	13.5
Median	2
Q1–Q3	2–4.8
Min–Max	0–116
Missing	0

Hours between trauma and admission in ICU*Available hour of trauma - Other hospital (N=14)*

Mean	7.9
SD	9.6
Median	4
Q1–Q3	3–6
Min–Max	2–34
Missing	0

Hours between trauma and admission in ICU*Available hour of trauma - Same hospital - Emergency room (N=67)*

Mean	3.6
SD	3.7
Median	2
Q1–Q3	2–4
Min–Max	0–19
Missing	0

Hours between trauma and admission in ICU*Available hour of trauma - Other hospital - Emergency room (N=14)*

Mean	7.9
SD	9.6
Median	4
Q1–Q3	3–6
Min–Max	2–34
Missing	0

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Characteristics of the trauma - Pediatric patients

Type of traumatic brain injury	N	%
Penetrating	2	1.8
Crush	14	12.5
Blast	1	0.9
Closed	94	83.9
Unknown	1	0.9
Missing	1	

Workplace accident	N	%
No	111	99.1
Yes	1	0.9
Unknown	0	0.0
Missing	1	

Intention	N	%
Accidental	104	92.9
Self-inflicted injury	1	0.9
Violence	4	3.6
Other	0	0.0
Unknown	3	2.7
Missing	1	

Trauma Dynamics	N	%
Traffic accident	51	45.5
Gunshot	2	1.8
Weapon	1	0.9
Blunt object	6	5.4
Low energy fall	28	25.0
High energy fall	15	13.4
Other	6	5.4
Unknown	3	2.7
Missing	1	

Place	N	%
Public place	61	54.5
Sports / Recreation	7	6.2
Home	43	38.4
Unknown	1	0.9
Missing	1	

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Type of trauma - Pediatric patients

Type of lesion °	N	Alone	With G	With H	With G+H
Diffuse Injury *	16	8	2	4	2
Focal Damage **	72	31	7	24	10
G: Traumatic subarachnoid haemorrhage	29	4	/	4	/
H: Skull fracture	61	17	4	/	/

Marshall Classification	N	%
Diffuse Injury I (no visible pathology)	18	20.7
(D-II) Diffuse injury II	35	40.2
Diffuse Injury III (edema)	6	6.9
Diffuse Injury IV (shift>5mm)	6	6.9
(5-EML) Evacuated mass lesion	22	25.3
Cerebral contusion/laceration	0	0.0
Extradural/epidural haematoma	17	77.3
Traumatic Subdural haematoma	5	22.7
Traumatic intraparenchymal bleeding	0	0.0
(6-NEML) Not Evacuated mass lesion	0	0.0
Cerebral contusion/laceration	0	0.0
Extradural/epidural haematoma	0	0.0
Traumatic Subdural haematoma	0	0.0
Traumatic intraparenchymal bleeding	0	0.0
Missing	26	

Prevalent lesion: DIFFUSE INJURY (N): 16

Diffuse injury	N	Alone	With G	With H	With G+H
A: Traumatic diffuse injury without oedema	12	7	2	3	0
B: Traumatic diffuse injury with oedema	4	1	0	1	2

Petechiae	N	%	Midline shift>5 mm	N	%	Cistern conditions	N	%
No	6	40.0	No	12	80.0	Normal	11	73.3
Yes	9	60.0	Yes	3	20.0	Compressed or distorted	1	6.7
Missing	1		Missing	1		Absent	3	20.0
						Missing	1	

Presence of focal damage	N	%
No	9	60.0
Yes	6	40.0
Missing	1	

Focal lesion	N	%
Presence of focal damage (N=6)		
Traumatic subdural hematoma	0	0.0
Extradural or epidural hematoma	1	16.7
Contusion and/ or brain laceration	2	33.3
Traumatic intraparenchymal hemorrhage	3	50.0
Missing	0	

Lesion volume > 25ml §	N	%	Evacuated mass	N	%
(N=2)			(N=6)		
No	2	100.0	No	6	100.0
Yes	0	0.0	Yes	0	0.0
Missing	0		Missing	0	

° diffuse injury and focal damage are mutually exclusive. In case of coexistence clinician has to choose and indicate the prevalent damage.

* Traumatic diffuse injury without oedema, Traumatic diffuse injury with oedema.

** Cerebral contusion/laceration, Extradural/epidural haematoma, Traumatic Subdural haematoma, Traumatic intraparenchymal bleeding.

§ Only for > 10 years old.

General report - Year 2014

Type of trauma - Pediatric patients

Prevalent lesion: FOCAL DAMAGE (N): 72

Focal damage	N	Alone	With G	With H	With G+H
C: Cerebral contusion/laceration	22	10	1	7	4
D: Extradural/epidural haematoma	26	14	1	10	1
E: Traumatic Subdural haematoma	20	6	3	6	5
F: Traumatic intraparenchymal bleeding	4	1	2	1	0

Lesion volume > 25ml § (N=32)	N	%	Evacuated mass	
			N	%
No	28	87.5	No	50 69.4
Yes	4	12.5	Yes	22 30.6
Missing	0		Missing	0

Petechiae	N	%	Midline shift > 5 mm	N	%	Cistern conditions	N	%
No	49	68.1	No	60	83.3	Normal	57	79.2
Yes	23	31.9	Yes	12	16.7	Compressed or distorted	12	16.7
Missing	0		Missing	0		Absent	3	4.2
						Missing	0	0

FOCAL DAMAGE (prevalent or compresent) (N): 78

Lesion volume > 25ml § (N=34)	N	%	Evacuated mass	
			N	%
No	30	88.2	No	56 71.8
Yes	4	11.8	Yes	22 28.2
Missing	0		Missing	0

Midline shift > 5 mm	N	%	Cistern conditions	
			N	%
No	64	82.1	Normal	61 78.2
Yes	14	17.9	Compressed or distorted	12 15.4
Missing	0		Absent	5 6.4
			Missing	0

FOCAL DAMAGE (prevalent o compresent) with evacuated mass (N): 22

Lesion volume > 25ml § (N=10)	N	%
Yes	4	40.0
Missing	0	

Midline shift > 5 mm	N	%
Yes	9	40.9
Missing	0	

Cistern conditions	N	%
Compressed or distorted	8	36.4
Absent	1	4.5
Missing	0	

FOCAL DAMAGE (prevalent o compresent) without evacuated mass (N): 56

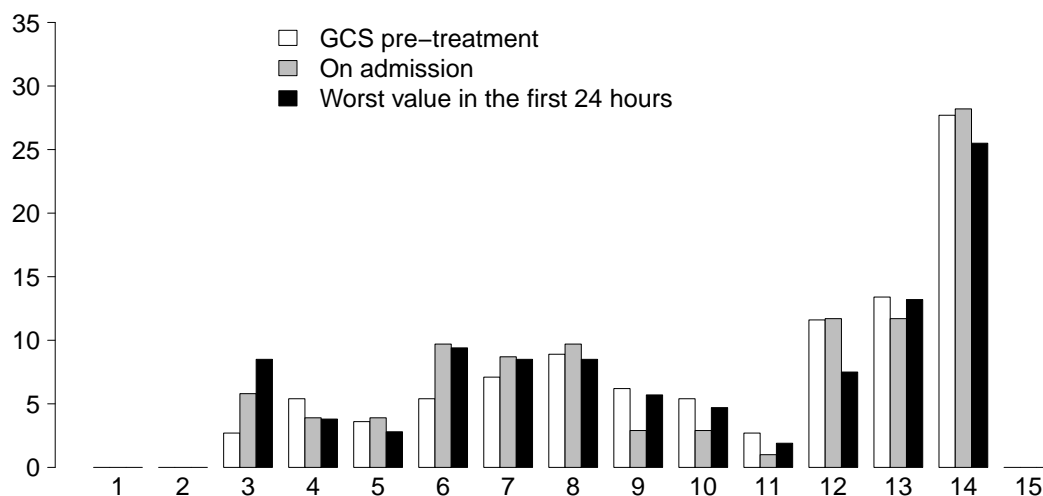
Lesion volume > 25ml § (N=24)	N	%
Yes	0	0.0
Missing	0	

Midline shift > 5 mm	N	%
Yes	5	8.9
Missing	0	

Cistern conditions	N	%
Compressed or distorted	4	7.1
Absent	4	7.1
Missing	0	

§ Only for > 10 years old.

Glasgow Coma Scale (%)



GCS pre-treatment

Median	12
Q1-Q3	8-14
Missing	1

GCS (admission)

Median	12
Q1-Q3	7-14
Not evaluable	10
Missing	0

GCS worst (first 24 hours)

Median	10
Q1-Q3	7-13.8
Not evaluable	7
Missing	0

GCS	GCSPre(N)	GCSPre(%)	GCSAdm(N)	GCSAdm(%)	GCSWorst24(N)	GCSWorst24(%)
3	3	2.7	6	5.8	9	8.5
4	6	5.4	4	3.9	4	3.8
5	4	3.6	4	3.9	3	2.8
6	6	5.4	10	9.7	10	9.4
7	8	7.1	9	8.7	9	8.5
8	10	8.9	10	9.7	9	8.5
9	7	6.2	3	2.9	6	5.7
10	6	5.4	3	2.9	5	4.7
11	3	2.7	1	1	2	1.9
12	13	11.6	12	11.7	8	7.5
13	15	13.4	12	11.7	14	13.2
14	31	27.7	29	28.2	27	25.5
15	/	/	/	/	/	/
Tot	112	100	103	100	106	100
3-8					44	41.5
9-13					35	33
14					27	25.5

Worst GCS during first 24h: best motor response	N	%
Obeys commands (5)	45	39.8
Localizes pain (4)	36	31.9
Flexion to pain (3)	9	8.0
Extension to pain (2)	6	5.3
None(1)	10	8.8
Not available	7	6.2
Missing	0	

GCS trend	N	%
Available information (N=109)		
GCS 3 stable	3	2.8
GCS from 3 to 4-8	0	0.0
GCS from 3 to > 8	0	0.0
GCS from 4-8 to 3	3	2.8
GCS 4-8 stable	11	10.1
GCS from 4-8 to > 8	19	17.4
GCS from > 8 to 3	0	0.0
GCS from > 8 to 4-8	4	3.7
GCS > 8 stable	69	63.3
Missing	0	

General report - Year 2014

Before admission to ICU - Pediatric patients

Availability measure systolic blood pressure pre ICU	N	%
--	---	---

No	51	45.5
Yes	61	54.5
Missing	1	

Clinically relevant hypotension	N	%
---------------------------------	---	---

No	12	10.7
Yes	97	86.6
Not available	3	2.7
Missing	1	

Value (the lowest) of systolic blood pressure	
---	--

Mean	103.3
SD	24.2
Median	100
Q1–Q3	95–115
Min–Max	20–160
Missing	0

Availability measure Hypoxia pre ICU	N	%
--------------------------------------	---	---

No	48	42.9
Yes	64	57.1
Missing	1	

Clinically relevant hypoxia	N	%
-----------------------------	---	---

No	20	17.9
Yes	88	78.6
Not available	4	3.6
Missing	1	

Value (the lowest) to peripheral oxygen saturation	
--	--

Mean	95.6
SD	11.5
Median	98
Q1–Q3	96–99
Min–Max	10–100
Missing	0

Pupils in the emergency room	N	%
------------------------------	---	---

GCS pre < 14 (N=81)	N	%
Bilaterally reactive and/or miotic	62	81.6
Unilaterally dilated and non-reactive	10	13.2
Bilaterally dilated and non-reactive	3	3.9
Not assessable	1	1.3
Not available	0	0.0
Missing	5	

Hemoglobin ER (gr/dl)	
-----------------------	--

Mean	11.7
SD	2.2
Median	12
Q1–Q3	11–12.9
Min–Max	1.1–16.6
Not available	17
Missing	1

Blood glucose at ER (mg/dl)	
-----------------------------	--

Mean	149.2
SD	55.0
Median	140
Q1–Q3	112.5–165.2
Min–Max	80–358
Not available	26
Missing	1

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Complications in the ICU - Pediatric patients

Neurological complications during the stay	N	%
No	89	79.5
Yes	23	20.5
A: Intracranial hypertension	8	7.1
B: Intracranial hypertension refractory or intractable	6	5.4
C: At least one episode of dilated pupils unreactive to light	8	7.1
D: Reduction of serum sodium	5	4.5
E: Post-surgical intracranial bleeding	0	0.0
F: Non-surgical intracranial bleeding	1	0.9
G: Seizures	4	3.6
H: Brain edema	7	6.2
I: Drowsiness/agitation/delirium	5	4.5
Missing	1	

Neurological complications during the stay (top 10)	N	%
I	5	4.5
G	3	2.7
ABC	2	1.8
ABCH	2	1.8
AH	2	1.8
ABCD	1	0.9
ABD	1	0.9
C	1	0.9
CDH	1	0.9
CH	1	0.9
Missing	1	

Other complications during the stay	N	%
Respiratory	3	2.7
Pneumothorax/Pneumomediastinum	2	1.8
Atelectasis	1	0.9
-	0	0.0
-	0	0.0
-	0	0.0
Cardiovascular	2	1.8
Acute severe arrhythmia: bradycardias	1	0.9
Cardiac arrest	1	0.9
-	0	0.0
-	0	0.0
-	0	0.0
Gastrointestinal and hepatic	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Other	7	6.2
Metabolic disorder	4	3.5
Other disease	3	2.7
Iatrogenic major vessels injury	1	0.9
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Infections	11	9.7
L.R.T.I. other than pneumonia	5	4.4
F.U.O. fever of unknown origin	2	1.8
NON-surgical urinary tract infection	2	1.8
Primary bacteraemia of unknown origin	1	0.9
Other viral infections	1	0.9
Pneumonia	1	0.9
-	0	0.0
-	0	0.0
-	0	0.0
-	0	0.0
Missing	0	

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Therapy in ICU - Pediatric patients

Neurosurgical operation	N	%
Primary decompressive craniectomy	8	7.1
Secondary decompressive craniectomy	2	1.8
No decompressive craniectomy	102	91.1
Missing	1	

Hypothermia	N	%
Yes	1	0.9
No	112	99.1
Missing	0	

External ventricular drainage without ICP monitoring	N	%
Yes	0	0.0
No	113	100.0
Missing	0	

External ventricular drainage with ICP monitoring	N	%
Yes	4	3.5
No	109	96.5
Missing	0	

Barbiturate infusion for refractory ICP	N	%
Yes	4	3.6
No	108	96.4
Missing	1	

Hyperventilation paCO₂<25 mmHg	N	%
Yes	5	4.5
No	107	95.5
Missing	1	

Indomethacin	N	%
Yes	1	0.9
No	111	99.1
Missing	1	

Mannitol (multiple doses)	N	%
Yes	12	10.7
No	100	89.3
Missing	1	

Hypertonic saline	N	%
Yes	8	7.1
No	104	92.9
Missing	1	

Sedation/analgesia	N	%
Yes	68	60.7
No	44	39.3
Missing	1	

Propofol infusion for refractory ICP	N	%
Yes	8	7.1
No	104	92.9
Missing	1	

Vasoconstrictor drugs	N	%
Vasoactive drugs in Core (N=12)	N	%
Yes	10	83.3
No	2	16.7
Missing	0	

General report - Year 2014**Outcome - Pediatric patients****ICU stay (days)**

Mean	3.6
SD	6.0
Median	2
Q1–Q3	1–3
Min–Max	1–45
Missing	0

ICU mortality

	N	%
Alive	106	93.8
Dead	7	6.2
Missing	0	

Brain death assessment

Dead (N=7)	N	%
Yes, with organ donation	3	50.0
Yes, without organ donation	0	0.0
No	3	50.0
Missing	1	

Organ/Tissue removal

(N=3)	N	%
No removal	0	0.0
Only organ removal	2	66.7
Only tissue removal	0	0.0
Organ and tissue removal	1	33.3
Missing	0	

Hospital stay (days) *

Mean	9.1
SD	10.8
Median	6
Q1–Q3	3–10
Min–Max	0–60
Missing	0

Hospital mortality

	N	%
Alive	106	93.8
Dead	7	6.2
Missing	0	

Cause of death

Dead (N=7)	N	%
MOF	0	0.0
Comorbidities	0	0.0
Cerebral	6	85.7
Hemorrhagic	1	14.3
Not determined	0	0.0
Missing	0	

Outcome at discharge from hospital

Alive (N=106)	N	%
Cannot follow simple commands	8	7.6
Can follow simple commands	97	92.4
Missing	1	

Last hospital mortality

	N	%
Alive	106	93.8
Dead	7	6.2
Missing	0	

* Days between admission in ICU and discharge from hospital.

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Mortality for main subgroups of patients - Pediatric patients

Age	N	%	†	‡
Newborn (0-4 weeks)	0	0.0		
1-6 months	4	3.6	0.0	0.0
6-12 months	4	3.6	0.0	0.0
12-24 months	14	12.6	14.3	14.3
2-4 years	15	13.5	6.7	6.7
5-8 years	22	19.8	0.0	0.0
9-16 years	52	46.8	7.7	7.7
Missing	2			

Comorbidities	N	%	†	‡
No	107	94.7	6.5	6.5
Yes	6	5.3	0.0	0.0
Missing	0			

Source of admission	N	%	†	‡
Same hospital	91	80.5	4.4	4.4
Other hospital	17	15.0	11.8	11.8
Long-term chronic care hospital	0	0.0		
Directly from the community (e.g., ambulance, home, ...)	5	4.4	20.0	20.0
Missing	0			

Type of traumatic brain injury	N	%	†	‡
Penetrating	2	1.8	50.0	50.0
Crush	14	12.5	14.3	14.3
Blast	1	0.9	0.0	0.0
Closed	94	83.9	4.3	4.3
Unknown	1	0.9	0.0	0.0
Missing	1			

GCS worst (first 24 hours)	N	%	†	‡
3-8	44	38.9	15.9	15.9
9-13	35	31.0	0.0	0.0
14	27	23.9	0.0	0.0
Not evaluable	7	6.2	0.0	0.0
Missing	0			

Worst GCS during first 24h: best motor response	N	%	†	‡
Obeys commands (5)	45	39.8	0.0	0.0
Localizes pain (4)	36	31.9	0.0	0.0
Flexion to pain (3)	9	8.0	0.0	0.0
Extension to pain (2)	6	5.3	16.7	16.7
None(1)	10	8.8	60.0	60.0
Not available	7	6.2	0.0	0.0
Missing	0			

GCS trend	N	%	†	‡
Available information				
(N=109)				
GCS 3 stable	3	2.8	100.0	100.0
GCS from 3 to 4-8	0	0.0		
GCS from 3 to > 8	0	0.0		
GCS from 4-8 to 3	3	2.8	100.0	100.0
GCS 4-8 stable	11	10.1	9.1	9.1
GCS from 4-8 to > 8	19	17.4	0.0	0.0
GCS from > 8 to 3	0	0.0		
GCS from > 8 to 4-8	4	3.7	0.0	0.0
GCS > 8 stable	69	63.3	0.0	0.0
Missing	0			

Clinically relevant hypotension	N	%	†	‡
No	12	10.7	41.7	41.7
Yes	97	86.6	2.1	2.1
Not available	3	2.7	0.0	0.0
Missing	1			

Clinically relevant hypoxia	N	%	†	‡
No	20	17.9	25.0	25.0
Yes	88	78.6	2.3	2.3
Not available	4	3.6	0.0	0.0
Missing	1			

Pupils in the emergency room	N	%	†	‡
GCS pre < 14 (N=81)				
Bilaterally reactive and/or miotic	62	81.6	3.2	3.2
Unilaterally dilated and non-reactive	10	13.2	20.0	20.0
Bilaterally dilated and non-reactive	3	3.9	100.0	100.0
Not assessable	1	1.3	0.0	0.0
Not available	0	0.0		
Missing	5			

Marshall Classification	N	%	†	‡
Diffuse Injury I (no visible pathology)	18	20.7	0.0	0.0
(D-II) Diffuse injury II	35	40.2	0.0	0.0
Diffuse Injury III (edema)	6	6.9	50.0	50.0
Diffuse Injury IV (shift>5mm)	6	6.9	50.0	50.0
(5-EML) Evacuated mass lesion	22	25.3	4.5	4.5
(6-NEML) Not Evacuated mass lesion	0	0.0		
Missing	26			

† ICU mortality (%)

‡ Last hospital mortality (%)