Trauma Network Romandie

Comparative report on year 2014

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Summary

I. Introduction

Since 2011, the management of serious injuries is linked to the Highly Specialized Medicine (MHS). This management was allocated to twelve Swiss hospitals. The committee for MHS has declared that, amongst organizational and resource requirements, each Traumacenter need to fulfill the following requests:

- adhere to the Swiss Traumaregistry (STR) with the following inclusion criteria: ISS (Injury Severity Score) > 15 and/or AIS (Abbreviated Injury Scale) head score ≥ 3),
- receive more than 40 patients with ISS ≥ 20 and/or AIS head score ≥ 3.

Internationally used cut-offs for injury severity are ISS > 15, indication "severe injury" and ISS > 24 ("critically injury"). The MHS cut-off of ISS ≥ 20 is an arbitrarily chosen value. For the purpose of international comparability, all three thresholds have been included in this analysis.

In late 2010, the hospital directors of the Lausanne University Hospital (CHUV) and the Geneva University Hospital (HUG) decided (in the framework of the GE-VD association) to develop a collaborative project for the treatment of severe injured patients. Sion Hospital (CHVR) was included into this collaboration. The aim was to enable the collaboration between the three French-speaking Traumacenters in Switzerland.

A mandate has been entrusted to Dr. Heim, cheffe de clinique in anesthesiology at CHUV, and Dr. Andereggen, associate in emergency surgery unit at HUG, asking them to prepare a draft to that end. This mandate included several points, in particular the creation of a common registry, designation of a team in each center, homogeneous support arrangements and common specific training.

Specific resources for this project are:

- a project head for the three centers,
- a data-manager coordinator for three centers,
- a data-manager for each center,
- a common AIS / ISS-coder for the three centers.

The two first positions are currently vacant. A clinical lead was appointed for each center.

Currently, each of the three centers (CHUV, HUG and CHVR) has a registry with a common dataset and inclusion criteria. Following the creation of the Swiss Trauma registry, which is operational since 1 January 2015, it did not seem necessary or relevant to build a Romandie registry.

This report aims at presenting a comparative overview of the characteristics and outcome of trauma patients admitted or secondarily transferred to CHUV, to HUG and to CHVR from the 1st of January to the 31st of December 2014. Analysis is performed based on data from the institutional Traumaregistry "TRAC" for the CHUV, from the Traumaregistry HUG for the HUG and from the Traumaregistry CHVR for the Sion Hospital.

II. Methodology

1. Inclusion criteria

All adult trauma patients (≥ 16 years) admitted to shock room were included to each of the local Traumaregistries. In HUG and CHVR, patients not admitted to shockroom but fulfilling the MHS criteria for inclusion into the Swiss Traumaregistry (ISS > 15 and/or AIS head score ≥ 3) were included while as in CHUV, the inclusion of these patients started only on 1 January 2015. Pediatric and burn patients were excluded from this report.

2. Data collection and codification

For all center, data collection and entry is performed by a trained data-manager on the basis of patients' electronic files. Codification of patients' injuries is done following AIS/ISS 2008 international standards by a AAAM-trained nurse (Association for the Advancement of Automotive Medicine) (1).

3. Statistics

The characteristic of the population are presented for each receiving traumacenter. Results are expressed in percentages for frequencies. When necessary, a measure of dispersion was given using median, lower and upper interquartile ranges (IQR1-IQR3), representing respectively 25% and 75% of the headcounts. Qualitative variables were compared using Fisher exact or χ^2 test. Continuous variables were compared using Student's *t*-test if distribution is normal and there were compared using a Kruskal-Wallis if distribution is not normal. We noted *p* the significance level. A significance threshold of 0.05 was adopted for all of the statistical analyses.

Statistics and graphics were performed using Microsoft Office 2007 Excel©, JMP© 10 2012 and R 3.2.2.

III. Results

1. Patients' characteristics

Table I represents the numbers of admitted patients to each of the collaborating centers. The characteristics of the 241 patients included to CHUV, 254 patients to HUG and 293 patients to CHVR are shown in table II.

Table I. Trauma patients admitted to CHUV, HUG or CHVR.

	CHUV		HUG		CHVR	
	n	%	N	%	n	%
Number of admissions	328		254		322	
Number of burned patients	40	12	na		na	
Number of pediatric cases	55	17	na		29	9
Number of cases qualifying for this report [1]	241	73	254	100	293	91
Number of secondarily admissions	37	15	12	5	34	12

[1] Cases qualifying for this report: adult patients (≥ 16 years), burned excluded.

Abbreviation: na = not available.

Table II. Characteristics of the included trauma patients.

	CHUV		HUG		CHVR	
	n	%	N	%	N	%
N	241		254		293	
Gender						
Male	172	71	196	77	212	72
Female	69	29	58	23	81	28
Age						
Median	44		46		50	
(IQR)	(28-69)				(32-68)	

2. ISS and STR criteria

The inclusion criteria for STR are ISS > 15 and/or AIS head score ≥ 3 and the inclusion criteria for MHS are ISS ≥ 20 and/or AIS head score ≥ 3. Table III represented the distribution of the headcount according to ISS and the number of patients who meets STR and MHS criteria.

Table III. ISS, STR and MHS criteria.

	CHUV		HUG		CHVR	
	N	%	n	%	n	%
Patients included in analyses	241	100	254	100	293	100
ISS						
ISS > 15	112	46	128	50	105	36
ISS ≥ 20	84	35	92	36	64	22
ISS > 24	67	28	76	30	41	14
STR criteria [2]	125	52	145	57	149	51
MHS criteria [1]	109	45	119	47	127	43

[1] Patients who meets MHS criteria: ISS ≥ 20 and/or AIS head score ≥ 3

[2] Patients who meets STR criteria: ISS > 15 and/or AIS head score ≥ 3

Abbreviation: ISS = Injury Severity Score; STR = Switzerland Trauma Registry; MHS = Highly Specialized Medicine.

We observed a significant relationship between ISS and centers (p = 0.021). HUG has a higher ISS that CHVR (p<0.01) [Figure 1]. The difference is not significant between HUG and CHUV (p=0.295) and between CHVR and CHUV (p=0.122).

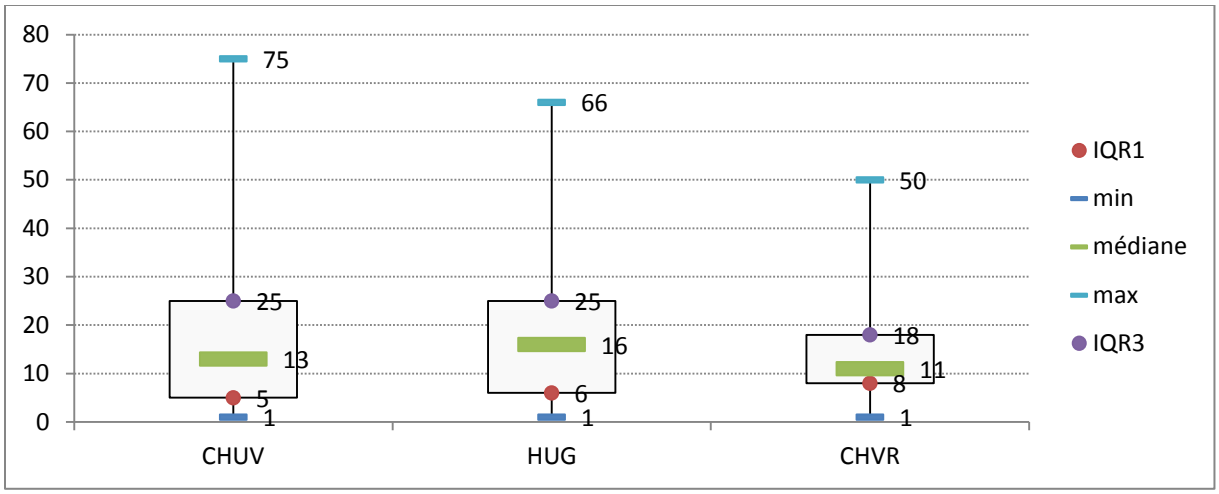

Figure 1: Distribution of ISS according by the center.

3. Type of trauma

Figure 2 represented the intention of trauma according to the centers. We observed significantly more accidents and less self-inflicted injury in CHVR as in comparison to CHUV and HUG (p<0.01).

Penetrating trauma represented 6%, 8% and 2% of cases to CHUV, HUG, and CHVR, respectively.

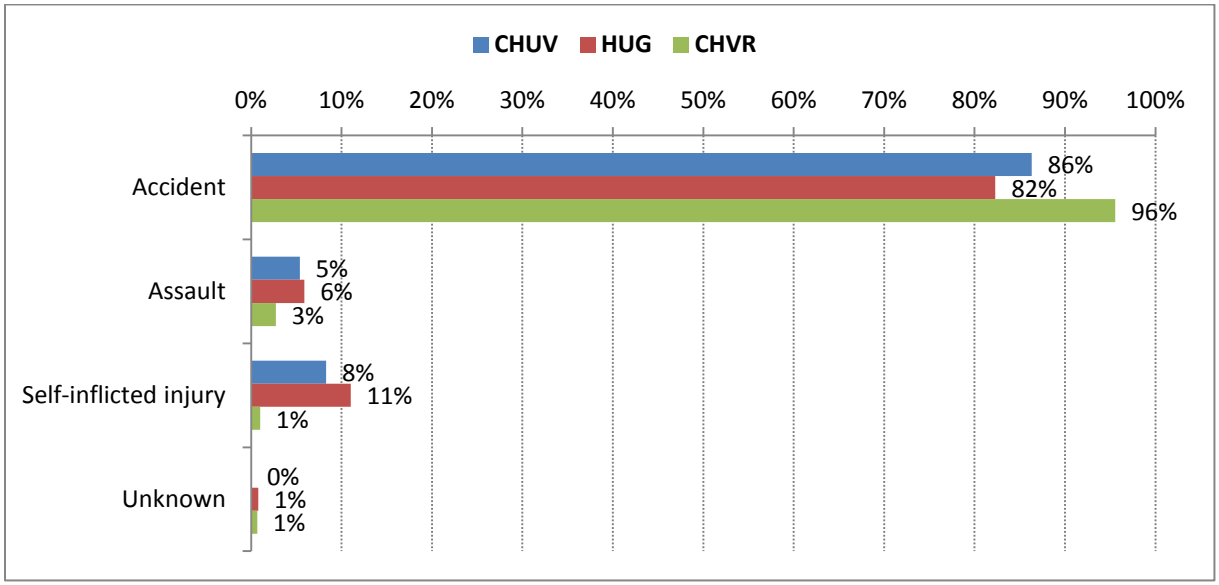

Figure 2. Intention of trauma.

Figure 3 represented the mechanism of injury according to the center.

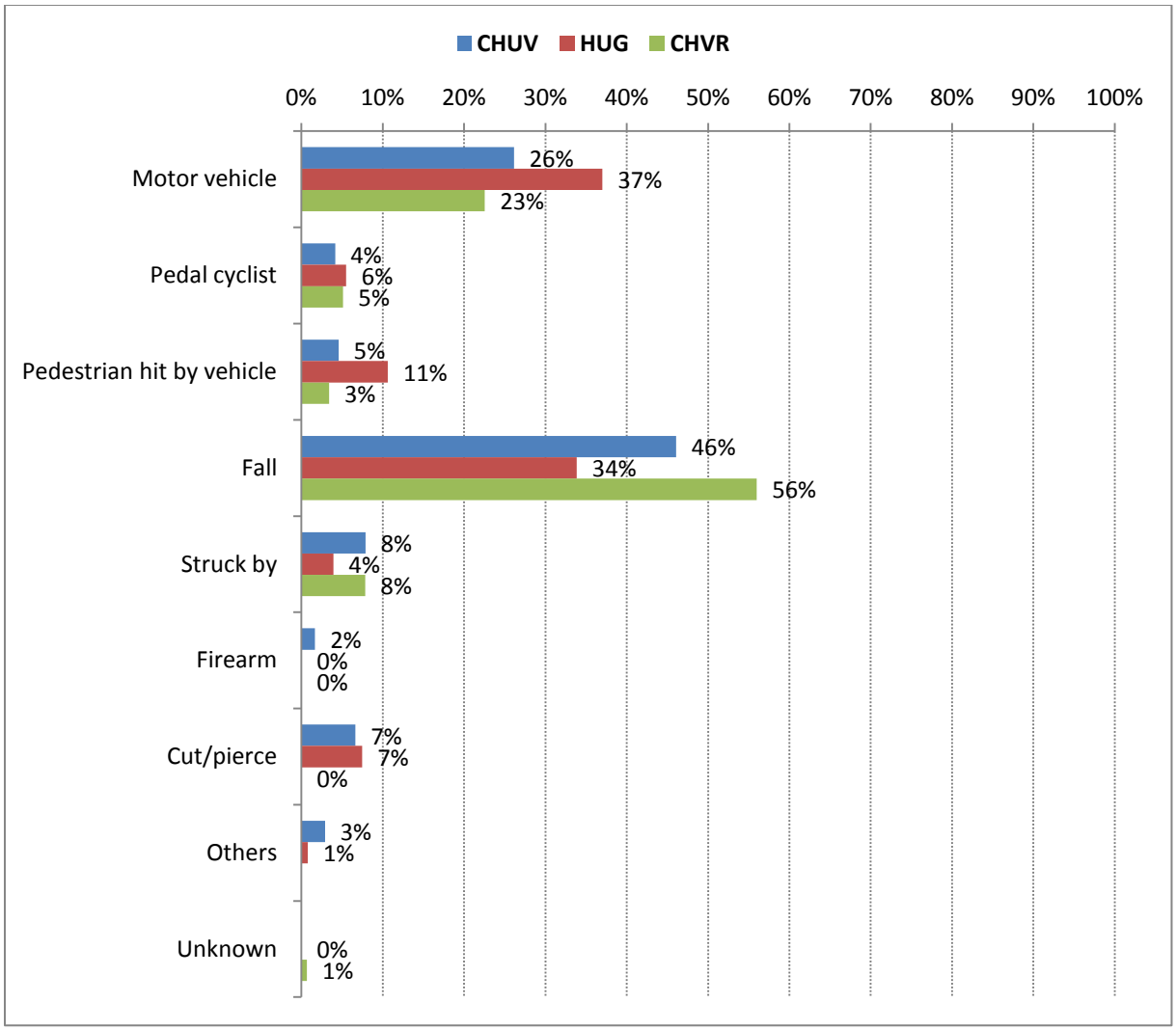

Figure 3. Mechanism of injury.

4. Outcome

Figure 4 shows the destination of the immediate transfer after shock room care: the number of patients having undergone an emergency intervention (defined as an immediate transfer to the operating room or the angiographic facility), the number of patients immediately admitted to the Intensive Care Unit (ICU) and the number of patients immediately transferred to the mortuary. The difference of distribution to the medical support after shock room care between each center is not significant.

Table IV shows the number of patients admitted to ICU during hospital stay and the length of stay in ICU.

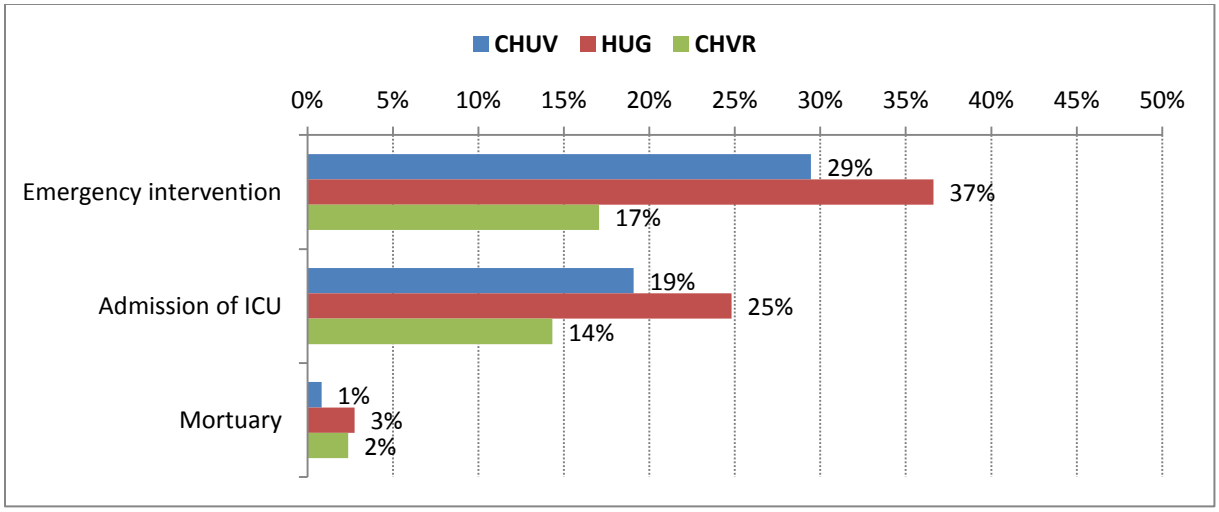

Figure 4. Medical support after shock room care.

Table IV. Admission to the ICU during hospital stay.

	CHUV		HUG		CHVR	
	n	%	n	%	n	%
Patients included in analyses	241	100	254	100	293	100
Admission to the ICU	101	42	133	52	81	28
LOS in ICU						
median (IQR)	4 (2-8)		4		4 (2-8)	

Abbreviations: ICU = Intensive Care Unit; LOS = Length of Stay.

Figure 5 showed the number of deaths according to the ISS group for each center.

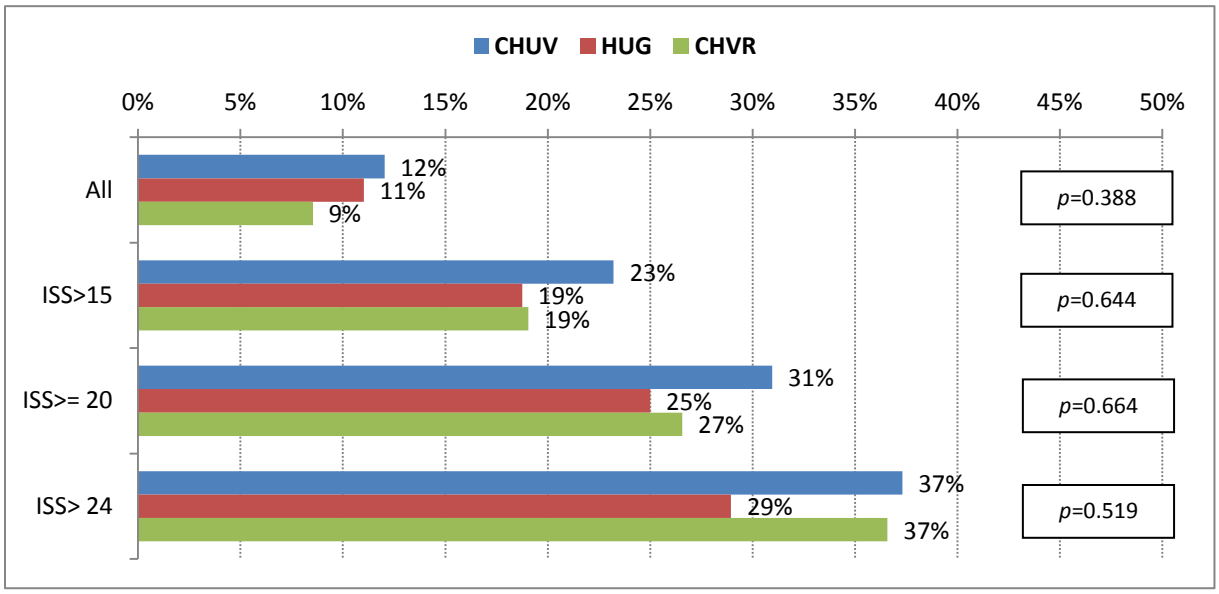

Figure 5. Mortality

IV. Conclusion

In 2014, the three institutions treated 241 (CHUV), 254 (HUG) and 293 (CHVR) adult trauma patients with potentially severe injuries (burn patients excluded).

We observed a significantly higher injury severity of patients admitted to the HUG registry as compared to CHVR. Although inclusion criteria for each of the three local registries are identical, the triage process for inclusion into the local registry is different in the three hospitals. While as the CHUV and CHVR registry include all patients admitted to shock room, in HUG there is a medical pre-triage in order to include only the most severely injured. Therefore, overtriage in CHUV might be greater and the number of patients with low ISS included into the registry might be higher. This is a potential explanation for the lower median ISS value in CHUV.

Accidents are significantly more common in CHVR compared to CHUV and HUG, while CHVR has significantly less self-inflicted injuries as the partner centers. Surprisingly, while as CHVR has less patients with ISS ≥20, the overall number of patients fulfilling the MHS-criteria is higher than in CHUV or HUG. This indicates a higher number of patients with severe head injury but overall low ISS.

A large variability in percentage of emergency interventions (29% in CHUV, 37% in HUG and 17% in CHVR) was identified.

Overall mortality showed no significant difference between the centers and no significant difference in the mortality rate for each ISS group. It seems appropriate to extend the analysis with multivariate analysis which is planned for the next annual report. Moreover, we consider a survival analysis to account for the time between the management and death of the patient.

Regarding this report, it must be mentioned that CHUV has adapted it is inclusion criteria for the local registry to the needs of the Swiss national Registry. Since 1 January 2015, CHUV screens all trauma patients arriving to the emergency department on fulfilling the STR-inclusion criteria. According to first results, this will increase the number of patients fulfilling the STR requirements by approximately 8-10 patients/month. In 2015, we expect to include about 340 patients into this report with close to 200 presenting with an ISS > 15.

V. Acknowledgments

We would like to thank all participating staff and departments that contributed to the data-collection within the three registries. A special thank goes to the departments of Anesthesiology, Emergency Medicine, Intensive care, orthopedic surgery, neurosurgery and visceral surgery.

VI. References

(1) Committee on Medical Aspects of Automotive Safety. Rating the severity of tissue damage. I. The abbreviated scale. JAMA. 1971; 215(2):277-80. doi:10.1001/jama.1971.03180150059012

VII. Abbreviations

AIS	Abbreviated Injury Scale
CHUV	Lausanne University Hospital (Centre Hospitalier Universitaire Vaudois)
CHVR	Sion Hospital (Centre Hospitalier du Valais Romand)
HUG	Geneva University Hospital (Hôpitaux Universitaires de Genève)
ICU	Intensive Care Unit
ISS	Injury Severity Score
LOS	Length Of Stay
MHS	Highly Specialized Medicine
STR	Switzerland Trauma Registry