

COMMENTARY TO HABILITATION THESIS¹

Characteristics of the research topic and objectives

The submitted body of work focuses on the forensic evaluation of sharp force injuries, with emphasis on their morphological characteristics, epidemiology, interpretation of the manner of death, and the application of modern imaging methods, particularly postmortem CT angiography (PMCTA).

Sharp force injuries represent a significant proportion of violent deaths, particularly in regions with restricted access to firearms. Despite their frequency, their forensic interpretation remains complex, especially in distinguishing between homicide, suicide, and accidental injury, and in reconstructing the mechanism of injury.

The main objectives of the submitted works were:

- to analyse epidemiological patterns of sharp force injuries in a defined population,
- to identify characteristic morphological features of injuries and their distribution,
- to improve the interpretation of the manner of death in complex and atypical cases,
- to introduce and evaluate PMCTA as a complementary diagnostic method in forensic practice,
- to integrate autopsy findings with imaging and clinical data to enhance diagnostic accuracy.

Methodology

The research is based on a combination of retrospective and prospective approaches using the following methodologies:

- analysis of autopsy records and forensic case files,
- detailed morphological evaluation of sharp force injuries,
- statistical analysis of epidemiological data,
- application of postmortem CT and postmortem CT angiography (PMCTA),
- correlation of radiological findings with autopsy results,
- evaluation of toxicological findings,
- case-based forensic analysis of atypical or complex scenarios.

Special emphasis was placed on the development and practical implementation of PMCTA, including technical modifications enabling improved visualization of vascular injuries.

Results

The results of the submitted works can be summarized as follows:

- Identification of typical patterns of sharp force homicides, including injury localization, number of wounds, and frequency of defensive injuries.
- Demonstration of the relationship between injury patterns and the manner of death, including the role of defensive wounds and associated blunt force trauma.

¹ The commentary must correspond to standard expectations in the field and must include a brief characteristic of the investigated matter, objectives of the work, employed methodologies, obtained results and, in case of co-authored works, a passage characterising the applicant's contribution in terms of both quality and content.

- Confirmation that combined blunt and sharp force injuries may indicate escalation of violence.
- Identification of specific epidemiological differences compared to previously published data, particularly in victim demographics and toxicological findings.
- Demonstration that PMCTA significantly improves the detection of vascular injuries, including small vessel lesions not easily identifiable during conventional autopsy.
- Development of a practical PMCTA protocol, including the use of contrast media combined with agar, improving visualization and interpretability of vascular structures.
- Presentation of complex and atypical cases, highlighting the importance of integrating autopsy findings with clinical and circumstantial evidence.
- Contribution to the interpretation of difficult cases, including those involving drug-induced psychosis, unusual injury mechanisms, or ambiguous manner of death.

Scientific contribution and significance

The submitted works contribute to the field of forensic medicine in several key areas:

- Systematization and standardization of the description and interpretation of sharp force injuries.
- Extension of knowledge on the epidemiology of violent deaths in Central Europe.
- Introduction and validation of PMCTA as a practical diagnostic tool in forensic pathology.
- Improvement of diagnostic accuracy in determining the manner of death.
- Enhancement of reconstruction of injury mechanisms based on combined morphological and imaging findings.
- Strengthening of the interdisciplinary approach between forensic pathology, radiology, and clinical medicine.

The results have direct applicability in forensic practice, expert reporting, and medical education.

Applicant's contribution

The applicant played a key role in all submitted works. His contribution can be summarized as follows:

- conception and design of the studies,
- supervision of data collection and analysis,
- interpretation of autopsy and imaging findings,
- development and implementation of PMCTA methodology in clinical practice,
- coordination of interdisciplinary collaboration,
- preparation and critical revision of manuscripts.

As a senior author and head of the department, the applicant was responsible for the overall research direction and integration of individual studies into a coherent research framework.

[1]² HANDLOS, Petr, Tereza SVECOVA, Adela VRTKOVA, Klara HANDLOSOVA, Marek DOKOUPIL, Ondrej KLABAL, Juraj TIMKOVIC and Matej UVIRA. Review of patterns in homicides by sharp force: one institution's experience. *Forensic Science Medicine and Pathology* [online]. 2023, 19(4), 525–533. ISSN 1556-2891. Available at: doi:10.1007/s12024-023-00576-8

² Bibliographic record of a published scientific result, which is part of the habilitation thesis.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	80	70	90

[2] HANDLOS, Petr, Matěj UVÍRA, Vladimír VOJTEK, Martina SMUTNÁ and Jana MERTOVIČ. harp-force injuries: Postmortem CT angiography. Soudní lékařství. 2024, 69(3), 34–36. ISSN 0371-8309.

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
15	80	80	95

[3] HANDLOS, Petr, Ondrej KLABAL, Vladimír VOJTEK, Klara HANDLOSOVA, Tomas KREJCI and Matej UVIRA. Determining the manner of death in victims in drug-induced psychosis: a case of an atypical head stab wound. Forensic Science Medicine And Pathology [online]. 2024, 20(4), 1458–1463. ISSN 1556-2891. Available at: doi:10.1007/s12024-024-00784-w

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	75	80	90

[4] DOKOUPIL, Marek, Klara MARECOVA, Matej UVIRA, Marek JOUKAL, Eva MRAZKOVA, Jana CHMELOVA and Petr HANDLOS*(Corresponding Author)*. Fatal delayed hemopericardium and hemothorax following blunt chest trauma. Forensic Science Medicine And Pathology [online]. 2019, 15(2), 272–275. ISSN 1556-2891. Available at: doi:10.1007/s12024-018-0069-5

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	70	70	85

[5] UVIRA, Matej, Klara MARECOVA, Marek DOKOUPIL, Igor DVORACEK and Petr HANDLOS*(Corresponding Author)*. Fatal deer attack in a rutting season. Forensic Science Medicine And Pathology [online]. 2019, 15(1), 93–96. ISSN 1556-2891. Available at: doi:10.1007/s12024-018-0048-x

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	70	65	85

[6] HANDLOS, Petr, Klara HANDLOSOVA, Ondrej KLABAL and Matej UVIRA. A rare suicide case involving fatal bleeding from varicose veins. Journal Of Forensic Sciences [online]. 2021, 66(5), 2020–2023. ISSN 1556-4029. Available at: doi:10.1111/1556-4029.14765

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
15	75	85	90

[7] HANDLOS, Petr, Matej UVIRA, Marek DOKOUPIL and Klara MARECOVA. Axe injury pattern in homicide. Forensic Science Medicine And Pathology [online]. 2019, 15(3), 516–518. ISSN 1556-2891. Available at: doi:10.1007/s12024-019-00112-7

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	75	80	90

[8] HANDLOS, Petr, Klara MARECOVA, Margita SMATANOVA, Igor DVORACEK and Martin DOBIAS. Fatal Hemorrhage from an Arteriovenous Fistula. Journal Of Forensic Sciences [online]. 2018, 63(5), 1577–1581. ISSN 1556-4029. Available at: doi:10.1111/1556-4029.13730

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
15	70	80	85

[9] DOBIAS, Martin, Klara MARECOVA, Katerina VRANOVA and Petr HANDLOS*(Corresponding Author)*. Penile carcinoma - a rare cause of sudden death. Forensic Science Medicine And Pathology [online]. 2019, 15(3), 506–508. ISSN 1556-2891. Available at: doi:10.1007/s12024-019-00098-2

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	70	65	85

[10] HANDLOSOVA, Klara, Ondrej KLABAL, Marek DOKOUPIL, Vladimir VOJTEK, Matej UVIRA and Petr HANDLOS. Fatal and Nonfatal Rip Saw Injuries. Journal Of Forensic Sciences [online]. 2020, 65(3), 999–1003. ISSN 1556-4029. Available at: doi:10.1111/1556-4029.14256

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	65	60	80

[11] HANDLOS, Petr, Marek DOKOUPIL, Marie STANKOVA, Marek JOUKAL, Igor DVORACEK, Matej UVIRA and Margita SMATANOVA. Fluid content in the pleural cavity protects internal structures against heat. Forensic Science Medicine And Pathology [online]. 2016, 12(4), 497–501. ISSN 1556-2891. Available at: doi:10.1007/s12024-016-9814-9

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
15	70	80	85

[12] MARECOVA, Klara, Matej UVIRA, Marek DOKOUPIL and Petr HANDLOS*(Corresponding Author)*. Stab wounds of the chest caused by penetration of duralumin rods. Forensic Science Medicine And Pathology [online]. 2018, 14(4), 558–560. ISSN 1556-2891. Available at: doi:10.1007/s12024-018-0004-9

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	70	65	80

[13] HANDLOS, Petr, Klara HANDLOSOVA and Marek JOUKAL. Exsanguination from arteriovenous fistula: suicide or chronic wound?. Forensic Science Medicine And Pathology [online]. 2020, 16(2), 377–378. ISSN 1556-2891. Available at: doi:10.1007/s12024-019-00190-7

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
15	70	85	90

[14] HANDLOS, Petr*(Corresponding Author)*. Additional practical considerations in the interpretation of multiple sharp-force injuries. Legal Medicine [online]. 2026, 80(102773, Article 102773). ISSN 1344-6223. Available at: doi:10.1016/j.legalmed.2026.102773

Experimental work (%)	Supervision (%)	Manuscript (%)	Research direction (%)
10	0	100	100