Journal of the Academy of Forensic Nursing

Research Reviews

AFN Journal Club Spring-Summer Reviews

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AFN Journal Club Spring-Summer Reviews

The AFN Journal Club meets regularly to review the quality of the evidence available to support our clinical practice. This is a core requirement of professional practice.

AFN Journal Review Criteria

- Evidence tables are for the review of studies that may have implications for clinical practice.
- All articles on this table have been reviewed by the AFN Journal Club.
- Abbreviations are listed in the legend following the reviews.

Melnyk Levels of Evidence (Melnyk & Fineout-Overholt, 2015)

- **Level 1 -** Systematic review & meta-analysis of randomized controlled trials; clinical guidelines based on systematic reviews or meta-analyses
- **Level 2 -** One or more randomized controlled trials
- **Level 3 -** Controlled trial (no randomization)
- **Level 4 -** Case-control or cohort study; correlation design; examines relationships
- **Level 5 -** Systematic review of descriptive & qualitative studies
- **Level 6 -** Single descriptive or qualitative study; does not examine relationships
- **Level 7 -** Expert opinion

Legend

NFS= *Nonfatal Strangulation*; IPV= *Intimate Partner Violence*; DA= *Danger Assessment*; EHR= *Electronic Health Record*; PVS= *Partner Violence Screening*; SA=*Sexual Assault*; LE=*Law Enforcement*; RR= *Risk Ratio*; CI= *Confidence Interval*; TBD= *Toluidine Blue Dye*; FN=*Forensic Nurse*

Completed Reviews

Chapman, B., & Natale, S. (Nov 2022). Sexual Assault and Semen Persistence. In M. Houck (Ed.), *Encyclopedia of Forensic Sciences*, (pp. 497–510). Elsevier. https://doi.org/10.1016/B978-0-12-823677-2.00231-2

Study Description/Background: This book chapter describes the forensic processes from the outset of a sexual assault investigation, focusing on the primary target of forensic biology analyses including offender cellular material, namely semen and spermatozoa evidence in targeting a POI.

Literature: 57 references; some were quite dated, but may be considered seminal works for this area of study; many were within 5 years; all were applicable to subject matter

Design/Methods: N/A

Sample: N/A

Analysis: N/A

Results/Limitations: Research studies cited in this article summarized the following findings: Semen is best seen with ALS using blue light and orange filter; preliminary AP testing must be read at 2 minutes; highest rate of sperm detection on endocervical swab samples seen during 24–36 hr interval; optimal interval for vaginal swab was 12–48 hrs; 1972 Morrison study found sperm within vagina up to 9 days post coitus and up to 12 days within the cervix; sperm present on deceased up to 3 days; degradation of sperm varies when comparing vagina and anus; microscopy was successful in detecting sperm on satin, terry towel, cotton after six washes; semen remains detectable on fabrics even after water immersion for up to 2 weeks noting that persistence of sperm is quite remarkable. Limitations of this article include data missing from table 1; data missing from table 2, specifically factors related to post SA details other than time from intercourse (such as showering, douching, menses, etc.); this article is expert opinion which is not a research method and lacks systematic inquiry; authors from Australia so some terms such as EEK do not translate to other countries; terms such as “high vaginal” and “low vaginal” are not clarified as to exact anatomical location and there is no healthcare/anatomy in paper; term of “external vaginal swab” used but the vagina is an internal structure so authors were likely indicating vulva but were not using anatomically correct terms.

Clinical Significance: Sperm can be visualized and detected through numerous visual and chemical techniques; sperm are persistent and can remain on fabric after washing, immersion, and water exposure so evidence should be collected even if patient has showered or washed clothing; semen can remain detectable vaginally up to 7 days, so FNs should consider evidence collection timelines past 5 days; items of evidentiary value should be obtained from POIs, including intimate samples such as penile swabs and pubic hair combings; Y-STR analysis is often used to overcome mixed DNA profiles since it can specifically target male DNA; male DNA can be used to identify a POI; semen presence remains a vital component of identifying POI and ensuring conviction of perpetrators.

Level of Evidence: 7

Dugan, S., Patch, M., Hoang, T., & Anderson, J. C., June 2024. Anoxic Brain Injury: A Subtle and Often Overlooked Finding in Non-Fatal Intimate Partner Strangulation. *The Journal of Emergency Medicine*. https://doi.org/10.1016/j.jemermed.2024.06.006

Study Description/Background: Purpose is to describe ABI symptom prevalence in a sample of patients reporting NF-IPS. While literature dedicated to the assessment of ABI in stroke victims is robust, there is a research gap on the identification of ABI in patients that survive NF-IPS. Emphasis on LOC as a measure of anoxia often fails to recognize the importance of amnesia as a separate marker of ABI. This study sought to understand this dichotomy using a standardized assessment tool (SHASTA) to identify symptoms of ABI, including amnesia, in NF-IPS patients seeking care.

Literature: 28 references; 16 were greater than 5 years with a few being seminal works; gap in research supports need for more research on ABI in NF-IPS; all references pertain to subject/topic.

Design/Methods: Retrospective, cross-sectional secondary data analysis adhering to the 22 item STROBE checklist. Reviewed by IRB. SHASTA used to collect the data. Second physician team member verified accuracy and data was entered into a structured Excel spreadsheet.

Sample: Consultations performed in multiple counties of northern California include four EDs embedded within three regional trauma centers ranging from Level II-IV. The program sees approximately 175–200 forensic medical patients per year, inclusive of but not limited to IPV, child abuse, SA, elder abuse, and human trafficking. Electronic health records of patients aged 18 and older who reported one or more strangulations that were assessed using SHASTA between May 1, 2019 and April 30, 2022 were reviewed. Resulted in a final sample of 191 patients with 267 strangulation events.

Analysis: Data were analyzed in Microsoft Excel and SPSS Version 28. Descriptive statistics were used to summarize the sample. Bootstrapping was used to estimate 95% CI for symptom frequencies. Sensitivity analyses were used to assess differences in symptom reporting among patients who sought care within the following time ranges: 1) the first 7 days; 2) the first 30 days; 3) all patients. A second set of sensitivity analyses

were run to compare inclusion vs exclusion of patients reporting headache during the event in the hypoxia variable. As this was a descriptive analysis of clinical data, no hypothesis testing was completed. Missing data for any variable was less than 2%.

Results/Limitations: Patients in this sample were primarily white (84.8%), 18–30 years only (41.9%), female (97.9%), and assaulted by male partners (97.9%). Fifty-one of the 191 patients (26.7%) presented within 7 days of the assault. Of the 267 total strangulation events, 206 events (77.2%) included a reported hypoxia symptom. Hypoxic symptom reporting ranged from 32.2% for hearing changes to 57.7% for vision changes in the entire sample. LOC was reported during 74 of 267 (27.7%) strangulation events, amnesia was reported during 145 of 267 events (54.3%), and there was amnesia reported without LOC in 49.0% of anoxic events. Neck findings on imaging occurred in 11.9% of patients (although not all were imaged). Limitations include inability to generalize outside this county in California, as well as generalizability to non-white female victims with male perpetrators; small sample size; recall bias due to LOC and/or amnesia; symptoms were self-reported; unclear how/if all clinicians using the SHASTA tool were trained; SHASTA tool is not validated and does not have documented interrater reliability.

Clinical Significance: More research on SHASTA tool needed (evaluating/validating). LOC alone is an imperfect measure of anoxia for patients following strangulation and should not be the single marker of anoxia used in evaluating NF-IPS. Per authors, screening patients reporting NF-IPS for amnesia in addition to LOC may enhance detection of ABI, increase considerations for imaging, and improve the treatment of acute and chronic symptoms.

Level of Evidence: 6

Giolitti, J., Behmlander, A., Brief, S., Dixon, E., Hudock, S., Rossman, L., Solis, S., Busman, M., Ambrose, L., Ouellette, L., & Jones, J. (Sept 2024). Evaluating Digital Imaging Technologies for Anogenital Injury Documentation in Sexual Assault Cases. 2(9): 770-774. *IgMin Research.* https://doi.org/10.61927/igmin246

Study Description/Background: Photo-documentation is a critical component of care and an indispensable skill for forensic clinicians treating patients who have experienced violence and trauma. This retrospective study examines the frequency and nature of anogenital injuries identified through colposcope digital imaging in comparison to those detected using a high-resolution camera system.

Literature Review: 14 references; only two within 5-year window; all relate to subject matter.

Design/Methods Retrospective: Before-and-after trial to assess anogenital injuries presenting after SA to a NEC during a 3-year study period (January 1, 2016–December 31, 2018). The NEC has a team of nine forensic nurses who have received training in conducting medical-forensic examinations using colposcopy with nuclear staining and digital imaging. These nurses completed a SANE training program which consisted of at

least 40 hours of classroom preparation and 40 hours of practical training. Before the start of the study, each nurse had already conducted more than 200 SA examinations. Each patient underwent a forensic examination consisting of direct visual inspection, TBD application, and colposcopy. Photographs out of focus or poor quality are retaken. Patients evaluated during 2016–2017 had injuries documented using a Cooper Surgical Liesegang colposcope system; those seen in 2018 had injuries documented using the high-resolution SDFI camera system. Anoscopy was performed at the discretion of the examiner. Examiners used the TEARS classification system to record injuries. Three nurse examiners, who received training in research methodology, reviewed the medical records. The research staff was trained in data abstraction using a set of simulated cases. To ensure consistency, one of the researchers regularly met with the abstractors to address any queries and ensure that definitions were consistently applied. A standardized classification system was used to document patient histories, demographics, assault characteristics, and injuries. This retrospective study was approved by the Corewell Institutional Review Board.

Sample: Total of 354 female patients greater than 16 years old (177 in each group). Referred by crisis line contacts and LE dispatch. SA victims presenting to the five downtown EDs were transported to the NEC for assessment after triage and initial evaluation. SA survivors were eligible for inclusion if they consented to a genital examination. SA subjects defined as vaginal penetration involving force or the threat of force or incapacity and no consent. Exclusion criteria included victims who had missing or incomplete documentation, declined forensic examination, had a vague or unclear patient history (e.g., intoxication), had a prolonged time from SA to evaluation (greater than 72 hours), or were <16 years old. Majority of samples were white, single, nulliparous, endorsed vaginal SA, and presented within 1 day of SA.

Analysis: The collected data was entered into a Microsoft Excel spreadsheet. All the analyses were conducted using SAS statistical software. To ensure data reliability, one investigator critically reviewed an arbitrary sample of 15% of the charts and assessed the consistency using the Kappa reliability test. Descriptive statistics provided information on the frequency, type, and location of anogenital injuries, classified according to the TEARS system. Student's t-test and Chi-square tests were utilized to compare injuries among the examined survivors. The level of significance for all tests was $p<.05$.

Results/Limitations: The total number of injuries in patients examined with standard digital colposcopy was 2.3 + 1.9. In comparison, patients examined using the high-resolution camera system had a total of 3.2 + 2.5 injuries documented ($p< 0.001$). Patients examined with standard digital colposcopy had significantly fewer anogenital injuries. High resolution SDFI camera system identified more abrasions (51.1% vs 27.0%, $p< 0.001$). The injury pattern was not statistically different ($p = 0.21$); common injury sites in both groups were posterior, including the fourchette, labia minora, and fossa navicularis. Limitations include reliance on recorded data (response bias); variations in clinical evaluations among different SANEs (reporting bias); only women that consented to a SANE exam included (selection bias); comparisons among different patients at different points in time so exact patients were not evaluated with each imaging device; not generalizable outside this location in the U.S.; not generalizable to men, women less than 16 years old, non-white patients, transgender patients, multiparous

patients, patients that don't report to medical and/or LE for exam, and patients that present outside of immediately acute window. Also, used TEARS acronym which is no longer evidence based (uses ecchymosis but blunt force trauma is a mechanism for contusions; ecchymosis can be unrelated to trauma and caused spontaneously; also, lacerations are the term when the mechanism is blunt force trauma and in addition, redness may be caused from many factors and is not injury specific).

Clinical Significance: Documentation of injuries following sexual assault can provide valuable assistance to the patient, as well as the police, prosecutor, and jury when making decisions related to the case, such as encouraging patients to report to LE, persuade LE to initiate charges, and motivate prosecutors to seek a conviction. The ability to obtain high-quality photo documentation is an essential skill for all forensic clinicians. High-resolution camera systems should be considered for SANE programs as they may have the ability to consistently detect more anogenital injuries; however, regardless of imaging equipment used, SANEs must be proficient in their equipment. Would be interested to know the nurses' feedback on each system, so perhaps this article is a good segway into a qualitative article on nurse input pertaining to camera systems that produce the highest quality images, are user friendly, and overall preferred in clinical practice.

Level of Evidence: 6

Legend:

ABI=Anoxic Brain Injury; ALS=Alternative Light Source; CI=Confidence Interval; DNA=Deoxyribonucleic Acid; EEK=Early Evidence Kit; ED=Emergency Department; FN= Forensic Nurse; IRB=Institutional Review Board; LE=Law Enforcement; LOC=Loss of Consciousness; NEC=Nurse Examiner Clinic; NF-IPS=Non-Fatal Intimate Partner Strangulation; POI=Person of Interest; SA=Sexual Assault; SANE=Sexual Assault Nurse Examiner; SDFI= Secure Digital Forensic Imaging; SHASTA=Strangulation Hypoxia Anoxia Symptom TBI Assessment; STROBE=Strengthening the Reporting of Observational Studies in Epidemiology; TBD=Toluidine Blue Dye; TEARS=Tear, Ecchymosis, Abrasion, Redness, Swelling; Y-STR= Short Tandem Repeat of Y Chromosome

Reference

Melnyk, B.M., & Fineout-Overholt, E. (2015). "Box 1.3: Rating system for the hierarchy of evidence for intervention/treatment questions" in *Evidence-based practice in nursing & healthcare: A guide to best practice (3rd ed.)* (pp. 11). Philadelphia, PA: Wolters Kluwer Health. ISBN 9781451190946