



Title: INCIDENCE AND PATTERNS OF MENSTRUAL IRREGULARITIES IN PEDIATRIC PATIENTS AFTER CONCUSSION

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Background: Abnormal menstrual patterns have been observed in women following a traumatic brain injury, which may be the result of disruption in the hypothalamic-pituitary-ovarian axis. The incidence and clinical significance of menstrual irregularities (MI) in pediatric patients after concussion is not well understood.

Purpose: Determine the incidence and patterns of menstrual irregularities in pediatric patients after a concussion and whether this is associated with prolonged recovery time.

Methods: A retrospective cohort chart review of MI in 185 female concussion patients was performed using a questionnaire survey at each visit. The survey asked for number of years since first menses, hormonal contraceptive use, if any MI since the concussion, and type of MI if applicable. Data was collected from 11/1/2018 to 5/30/2019. Patients with menarche less than 2 years and/or had experienced irregularities prior to the concussion were excluded from the study. Patients who indicated use of a hormonal contraceptive were included in the study.

Results: MI was reported in 45 (24.3%) total patients following a concussion, of which 26 (57.8%) were 11-20 years old. The majority of pediatric cases with MI were between the ages of 16 and 20 (73.1%), while only 26.9% were between the ages of 11 and 15. 84.6% of pediatric patients with reported MI had prolonged post concussive symptoms (PPCS).

26.9% of pediatric patients reporting MI also reported using some type of hormonal contraceptive (IUD, OCP, contraceptive injections). MI was more common in hormonal contraceptive users than non- hormonal contraceptive users (RR-2.18).

MI patterns after concussion were reported as increased frequency of periods, longer and shorter duration of menstruation, or change in flow of menstruation. Recovered pediatric patients with reported MI had an average recovery time of 142 days, while recovered pediatric patients without reported MI had an average of 133 days of recovery time, which was not statistically significant ($p = 0.825$).



Conclusion: Menstrual irregularities are common after pediatric concussions and most common in the PPCS population with the highest rates in the older adolescent (16-20) age group. MI may be an important predictor of PPCS and should be reviewed by clinicians in the setting of head trauma. Recovery time after pediatric concussion was longer in the recovered menstrual irregularity group but was not statistically significant. Hormonal contraceptives may have been a contributor to MI in the pediatric concussion cohort.