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Does Pain During Physician-Performed Syringe and Needle Procedures Indicate Trauma to Patient Tissues?

Gautam R. Moorjani, Kye S. Park, Adrian A. Michael, Courtney R. Johnson, Wilmer L. Sibbitt, Jr., Arthur D. Bankhurst. University of New Mexico Health Sciences Center, Albuquerque, NM, USA

PURPOSE: During physician-performed syringe and needle procedures including arthrocentesis, physicians refer euphemistically to the presence of blood in the syringe as a “traumatic tap”. It is unclear how blood in the fluid aspirate is related to direct trauma to patient tissues and increased patient pain. We hypothesized that poor needle control during physician-performed syringe procedures traumatizes patient tissues and causes hemorrhage and increased patient pain.

METHODS: 33 subjects each underwent arthrocentesis of the knee. Pain was measured with the validated Visual Analogue Pain Scale (VAPS). Aspirated fluid was sent for cell count, white blood cell differential, culture, and volume. 13 subjects underwent arthrocentesis with a conventional syringe and 21 subjects underwent arthrocentesis with the reciprocating procedure device (RPP). The RPD is a safety device that replaces the conventional syringe in physician-performed syringe and needle procedures, and has been demonstrated to better control the needle and reduce pain compared to the conventional syringe. Red blood cell counts (RBC) were used to measure blood in aspirated fluid and RBC/WBC ratios were used to measure actual hemorrhage, and multivariate logistic regression was used to determine relationships between variables.

RESULTS: Patient pain during arthrocentesis significantly and independently predicted blood (RBC) in aspirated fluid ($r = 0.49$, slope = 2496, CI 95% (862-4130), $p = 0.004$) and hemorrhage (RBC/WBC) ($r = 0.37$, slope = 1.52, CI 95% (0.1-2.97), $p = 0.04$).

When the better controlled safety device, the RPD, was compared to the conventional syringe, the RPD reduced blood in aspirated fluid by 40% (RBC: RPD: 10966 ± 12885 ;

Syringe: 16615 ± 16914 , $p < 0.01$), reduced hemorrhage by 60% (RBC/WBC: RPD: 4.13 ± 9.54 ; Syringe: 14.63 ± 14.65 , $p < 0.01$), reduced patient pain by 75% (VAPS: RPD: 1.14 ± 2.03 ; Syringe 4.62 ± 2.87 , $p < 0.01$), and improved fluid aspirate yield by 100% (aspirate volume: 15.7 ± 16.7 ml; RPD: Syringe: 7.15 ± 3.2 ml, $p < 0.01$).

CONCLUSIONS: Poor needle control during physician-performed syringe procedures is an important cause of trauma to patient tissues resulting in hemorrhage, increased patient pain, and decreased aspirate yield. Use of the RPD, a safety device that replaces the conventional syringe, reduces needle trauma to patient tissues and improves the outcome and aspirate yield of physician-performed syringe procedures, including arthrocentesis.