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1. EQUIPMENT

- Quick-Core biopsy needles (16G)
- 21G / 19G needles
- Sterile drapes
- Sterile Ultrasound sheath
- Sterile gown and gloves
- Procedure pack
- Face mask / hair cover
- Sterile swabs
- Antiseptic solution (Chlorhexidine 2%)
- 10mls / 20mls syringes
- 1 % Lignocaine (20-30mls)
- Non-adhesive dressing
- Sample container for processing

2. PERSONNEL

- Ultrasonographer performing the biopsy
- Technician / nurse / clinical fellow for tissue processing

3. CONSENT AND ADVERSE EVENTS

Consent should be gained prior to the patient attending for the synovial biopsy. This can ideally be done during clinic when the patient’s permission to perform the biopsy is initially sought.

There are no large prospective studies of complication rates for Ultrasound (US) guided synovial biopsies using this particular technique. Our own experience would suggest that this procedure is well tolerated and safe. We have listed the quoted complications for diagnostic arthroscopy, however we expect the complication rate for this procedure to be significantly better. An audit of our practice in 400 patients revealed only 1 wound infection with no other serious complications.

Approximately 25% of patients will have minor discomfort after the procedure. This is effectively managed with simple analgesia (non-steroidal anti-inflammatory drugs / Paracetamol) and should dissipate after 24hrs. Patients are able to walk after the procedure and can go home on the same day. Patients are asked to refrain from overuse of the biopsied joint and should ideally be accompanied home by a friend / relative.

Below is a list of most commonly experienced complications with arthroscopic procedures (approximate frequency in brackets) and should be discussed with the patient as potential complications.

i) JOINT INFECTION (0.2%)
ii) DEEP VENOUS THROMBOSIS (0.2%)
iii) HAEMARTHROSIS (1%)
iv) NEUROLOGICAL DAMAGE (0.02%)
v) WOUND INFECTION (0.5%)
vi) THROMBOPHLEBITIS (0.08%)

Patients be given a contact telephone number if they have any concerns following the synovial biopsy, specifically if there is pain, swelling, warmth or redness from the joint which may indicate infection.

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4. BIOPSY PROCEDURE

4.1. ORIENTATION OF PATIENT

- The patient should be placed supine on a bed. The patient may remain recumbent at 45 degrees, with the hand placed on a table next to the bed. Care should be taken not to elevate the hand or abduct the should significantly as this will cause patient discomfort during the procedure. The hand should be placed with the palm downwards.

4.2. PREPARATION

- With the patient suitably placed on the bed, suitable absorbent pads should be placed under the wrist. The skin should be prepped with appropriate sterilization fluid. A wide field should be sterilized in excess of the immediate area of interest, approx. Hand to mid-forearm (dorsal and ventral aspects).
- Sterile drapes should be positioned below the wrist on the table and a sterile drape used as a cuff at the mid forearm.
- The wrist should be placed in slight palmar flexion to improve access and identification of the synovial recesses. This can be facilitated by placing a few sterile sections of gauze under the wrist.
- The operator should now evaluate his equipment tray including biopsy needle and commence personal preparations for the procedure (hand washing, gloves, face mask, hair net, sterile gown).
- The US probe should be placed within the sterile sheath. US gel should be placed first upon the probes foot-print and slowly lowered into the sheath. The upper end of the sheath should be secured with a sterile tie or elastic band usually provided with the sheath.
- 10mls of 1% lignocaine should be aspirated into a syringe.
- US examination of the wrist should be performed prior to the biopsy to identify the extensor tendons of the 4th, 5th and 6th compartments, the scaphoid lunate junction and suitable synovial tissue. A suitable path should be planned as the normal anatomical relations may be disturbed in chronic Rheumatoid Arthritis. A suitable path can usually be identified inserting the needle superior to the Extensor Carpi Ulnaris (ECU) tendon and passing inferior to the Extensor Digiti Quinti Proprius (EDQ) and Long flexors (Extensor Digitum longus). The typical region for biopsy lies just superior to the scaphoid lunate ligament (Figure 1).
4.3. PROCEDURE

- Inject the 2-5mls of 1% lignocaine into the subcutaneous tissue up to the extensor retinaculum. Leave a minimum of 3-5 mins for effect.
- Using a 19G needle and under US guidance, aspirate any fluid. This should be stored for analysis. This is an opportunity to plan for the biopsy needle insertion. Now introduce 2-5mls of 1% lignocaine. This will enable a better image to be acquired during the procedure and facilitate clear identification of synovial tissue.
- The quick core biopsy needle should be primed before its introduction to the synovial space.
- Introduction of the biopsy needle into the wrist can now be performed under ultrasound guidance. This is best achieved by imaging the needle in a longitudinal plane as seen in figure 1.
- The needle should be extended and the throw identified on the US images (Figure 2). The throw of the needle should be placed against the surface of the synovium to maximize the opportunity for capturing the lining layer. Gentle pressure should be placed on the needle to oppose the throw and synovium and the trigger mechanism activated. NOTE: if the tip
of the extended needle is abutting a boney surface, backwards movement of the needle will occur at this stage with poor retrieval of tissue.

- After sufficient numbers of specimens have been harvested, any remaining fluid should be aspirated.

4.1. POST PROCEDURE CARE

- A small dressing can be used to cover the wound.
- A Neurovascular assessment should be made of the hand following the procedure and documented on the patients notes.
- The patient should remain in the department for a minimum of 30 mins post procedure. No specific monitoring is required.
- Contact details in case of complications should be provided to the patient. Specifically, patients should be asked to contact the team if there is significant pain, swelling or redness of the biopsied joint within the next 5-7 days.
- It is recommended that patients are followed up 3-5 days following the procedure either in person or by telephone.

5. TISSUE SAMPLES

Tissue should be collected in the appropriate method for processing as described below depending upon local study protocols.

5.1. Histological evaluation

- 10 biopsies formalin fixed and paraffin embedded
- 6 samples snap frozen.

5.2. Gene microarray analyses

- 6 biopsies immediately immersed in 2.5 ml RNAlater QIAGEN before RNA extraction