QUESTION 4

A 35yo married indigenous woman presents with a 4 day history of fever, mild headache and severe polyarthritis involving the wrists, elbows and knees. Joint pain has been only slightly relieved by naproxen 250mg twice daily and paracetamol 1-2g daily. Prior to the onset of arthritis, she had a sore throat for several days but denies rash, vaginal discharge or history of sexually transmitted diseases.

On examination, she appears unwell with a temperature of 39 degrees, an erythematous throat with tonsillar enlargement and a few small tender cervical lymph nodes. There is tenderness and soft tissue swelling of the wrists and knees. Cardiovascular examination is normal.

Which of the following investigations is most likely to identify the diagnosis?

A. Blood cultures for Staphylococcus aureus  
B. A high vaginal swab for Neisseria gonorrhoea  
C. A throat swab for Streptococcus species  
D. A stool culture for Yersinia enterocolitica  
E. A synovial fluid culture for Neisseria meningitidis

The symptoms described clinically fit with acute rheumatic fever:

- Sore throat in past 1-5 weeks
- Arthritis typically involving the large joints such as elbows, wrists and knees, classically migratory

SYMPTOMS OF ACUTE RHEUMATIC FEVER

- Sore throat (2/3 patients recall sore throat in past 1-5 weeks)  
- Polyarthritis (75%, more common in adults)  
  i. Typically migratory involving mainly the large joints such as the knees, ankles, elbows and wrists  
  ii. Usually subsides within 4 weeks  
- Carditis (40-50%, more common in younger children)  
  i. Can cause clinical picture of CCF  
- Sydenham chorea (15%)  
- Erythema marginatum (10%)  
  i. Non-pruritic, non-painful erythematous eruption on trunk  
  ii. Can persist intermittently for weeks to months  
- Other symptoms that can occur  
  i. Fever  
  ii. Abdominal pain  
  iii. Epistaxis  
  iv. Arthralgia

SIGNS

- Polyarthritis
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- Typical symptoms of inflammatory arthritis can occur
  - Small joints of hands and spine rarely involved
  - Classically migratory

- Carditis
  - Usually pancarditis
  - New murmur (MS common, isolated aortic disease rare)
  - Features of CCF
  - Pericarditis with rub or effusion

- Subcutaneous nodules
  - Associated with severe carditis
  - Usually appear several weeks after onset
  - Over bony prominences and tendons
  - Commonly at elbows, knees, wrists, ankles and over Achilles tendon, occiput or spinous processes of vertebrae
  - Usually persist for 1-2 weeks

- Erythema marginatum
  - Evanescent
  - Tendency to advance at the margins while clearing in the centre
  - Can disappear in minutes to hours
  - On trunk and proximal extremities

- Sydenham chorea
  - Rapid and uncoordinated involuntary purposeless movements
  - Emotional lability
  - Muscle weakness
  - Disappear during sleep
  - Can involve face, hands and feet

Untreated attacks last approximately 3 months.

Chronic rheumatic fever (> 6 months) occurs in < 5%.
CAUSES

- Group A beta-haemolytic strep (but not all serotypes)
- Thought to be due to an abnormal immune response to streptococcal components
- Resulting antibodies cross react with host antigens cause immunologic damage leading to the clinical manifestations
- Genetic differences in susceptibility

INVESTIGATIONS

- No single specific laboratory test can confirm the diagnosis
- Throat culture is the standard test to confirm the presence of group A streptococcus
- Rapid antigen detection tests have high specificity but low sensitivity so high number of false negatives
- Throat swab more sensitive
- ASOT, antistreptococcal DNAse B titre, antihyaluronidase titre
- Need to demonstrate a rise in the titre between acute and convalescent sera (3-6 weeks for ASOT, 6-8 weeks for DNAse B)
- Blood cultures to rule out IE, bacteraemia, gonococcal infection

DIAGNOSTIC CRITERIA

Major Criteria

1) Carditis
2) Polyarthritis
3) Chorea
4) Erythema marginatum
5) Subcutaneous nodules

Minor Criteria

1) Arthralgia
2) Fever
3) Elevated acute phase reactants
4) Prolonged PR interval

**Evidence of preceding streptococcal infection**

1) Positive throat culture for group A beta-haemolytic streptococci or positive rapid streptococcal antigen test
2) Elevated or rising streptococcal antibody titre

**Criteria met if:**

- Evidence of preceding group A streptococcal infection plus 2 major criteria or one major and two minor criteria

**COMPLICATIONS**

- Rheumatic heart disease occurs usually 10 to 20 years after original attack
- Mitral valve most commonly involved (classically mitral stenosis)

**TREATMENT**

Aim is to:

- Symptomatic relief
- Eradication of group A beta-haemolytic strep
- Prophylaxis against future infection to prevent recurrent cardiac disease

**Symptomatic Relief:**
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- For arthritis use anti-inflammatories (aspirin 4-8g/day in 4 divided doses or naproxen (5-7.5mg/kg bd)
- Paracetamol +/- codeine
- For carditis, treat the same as for cardiac failure of any cause
  If treatment for chorea is required can use carbamazepine or valproate

Eradication:

- Phenoxybenzamine (500mg orally bd) for at least 10 days
  OR
- Benzathine penicillin G as single dose (900mg IM)

For patients with penicillin allergy:

- Erythromycin 800mg (500mg) orally bd for 10 days

Antibiotic Prophylaxis:

- Recurrence rates decline with increasing age
- Monthly benzathine penicillin (900mg IM)
- If IM route not possible, use phenoxybenzamine 250mg orally bd
- For patients with penicillin allergy, erythromycin 400mg (250mg) orally bd
- Treatment recommended for minimum 10 years after last episode of acute rheumatic fever or until age 21 (whichever is longer)
- If residual heart disease of more than mild severity exists then continue until age 35
- If severe valve disease or surgery involved continue until age 40 at least
- Guidelines recently published by AHA regarding antibiotic prophylaxis for dental procedures etc (see below)
- Do not recommend any prophylaxis for RHD which is different to the previous guidelines (as published in therapeutic guidelines)

References: UTD, e-medicine, Circulation April 19 2007 (circ.ahajournals.org)

GONOCOCCAL ARTHRITIS
- Most common cause in young adults (while staph aureus most common overall)
- Caused by gram-negative diplococcus Neisseria gonorrhoeae
- Due to disseminated gonococcal infection which can manifest as arthritis-dermatitis syndrome (60%) or localised septic arthritis (40%)

Arthritis-Dermatitis Syndrome:

- Symptoms usually for 3-5 days before diagnosis
- Classic triad of migratory polyarthritis, tenosynovitis and dermatitis
- Migratory arthralgias most common presenting symptom
- Typically asymmetrical, polyarticular and involve upper extremities more than lower extremities
- Wrists, elbows, ankles and knees most commonly affected
- Tenosynovitis can occur, usually over dorsum of wrist and hand
- Painless, non-pruritic rash, typically on extremities – small papules, pustules or vesicles
- Non-specific constitutional symptoms (fever, myalgia, malaise)

Septic Arthritis Form:

- Usually 3-6 days after onset of illness
- Pain, redness and swelling in one or sometimes multiple joints

Diagnosis:

- Blood cultures
- Joint aspirate (although often negative)
- Culture from primary mucosal infection (positive in 90% of cervical samples, 50-75% of male urethral samples, 20% of pharyngeal samples and 15% of rectal samples)
- Urine culture
- Proven disseminated gonogoccal infection = positive blood cultures, synovial fluid cultures or other site sources
- Probable DGI = positive swab from primary mucosal surface
- Possible DGI = clinical syndrome and treatment responsive

Treatment:

- Same for both forms
- Joint washout rarely required
Clinical picture does not fit with staph aureus (polyarthritis not a common feature), yersinia (not history of GIT symptoms) or meningococcal infections (headache not prominent, arthritis not a common feature).

While both B and C could be correct, there are more features that suggest acute rheumatic fever rather than disseminated gonococcal infection:

- Symmetrical polyarthritis
- No rash
- No vaginal discharge or history of STDs
- Sore throat and cervical lymphadenopathy

In addition, the criteria for acute rheumatic fever will be met if there is evidence of preceding strep infection (pt has polyarthritis, arthralgia, fever).

So the answer is C – throat swab for streptococcus
Just to be aware of….

TABLE 3. Cardiac Conditions Associated With the Highest Risk of Adverse Outcome From Endocarditis for Which Prophylaxis With Dental Procedures Is Recommended

- Prosthetic cardiac valve
- Previous IE
- Congenital heart disease (CHD)*
  i. Unrepaired cyanotic CHD, including palliative shunts and conduits
  ii. Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure†
  iii. Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization)
- Cardiac transplantation recipients who develop cardiac valvulopathy

*Except for the conditions listed above, antibiotic prophylaxis is no longer recommended for any other form of CHD.
†Prophylaxis is recommended because endothelialization of prosthetic material occurs within 6 months after the procedure.

TABLE 4. Dental Procedures for Which Endocarditis Prophylaxis Is Recommended for Patients in Table 3

- All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa*

*The following procedures and events do not need prophylaxis: routine anesthetic injections through noninfected tissue, taking dental radiographs, placement of removable prosthodontic or orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, shedding of deciduous teeth, and bleeding from trauma to the lips.

TABLE 5. Regimens for a Dental Procedure

Amoxicillin/Ampicillin 2g orally/IM/IV 30 to 60 mins prior to procedure

If allergic to penicillin
Cephalexin 2g orally or clindamycin 600mg orally 30 to 60 mins prior to procedure

*Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage.
†Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema, or urticaria with penicillins or ampicillin.

TABLE 6. Summary of Major Changes in Updated Document

We concluded that bacteremia resulting from daily activities is much more likely to cause IE than bacteremia associated with a dental procedure.
We concluded that only an extremely small number of cases of IE might be prevented by antibiotic prophylaxis even if prophylaxis is 100% effective. Antibiotic prophylaxis is not recommended based solely on an increased lifetime risk of acquisition of IE. Limit recommendations for IE prophylaxis only to those conditions listed in Table 3. Antibiotic prophylaxis is no longer recommended for any other form of CHD, except for the conditions listed in Table 3. Antibiotic prophylaxis is recommended for all dental procedures that involve manipulation of gingival tissues or periapical region of teeth or perforation of oral mucosa only for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from IE (Table 3). Antibiotic prophylaxis is recommended for procedures on respiratory tract or infected skin, skin structures, or musculoskeletal tissue only for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from IE (Table 3). Antibiotic prophylaxis solely to prevent IE is not recommended for GU or GI tract procedures. The writing group reaffirms the procedures noted in the 1997 prophylaxis guidelines for which endocarditis prophylaxis is not recommended and extends this to other common procedures, including ear and body piercing, tattooing, and vaginal delivery and hysterectomy.

Previous guidelines (from antibiotic guidelines) suggest prophylaxis for medium to high risk groups.

**Prevention of endocarditis: cardiac conditions that have a risk for infective endocarditis with dental and other procedures (Table 2.11)**

<table>
<thead>
<tr>
<th><strong>High-risk conditions</strong></th>
<th><strong>Medium-risk conditions</strong></th>
<th><strong>Low-risk conditions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosthetic cardiac valves</td>
<td>Acquired valvular dysfunction (e.g., rheumatic heart disease) in non-Indigenous patients</td>
<td>Isolated secundum atrial septal defects</td>
</tr>
<tr>
<td>Bioprosthetic homograft</td>
<td>Congenital cardiac malformations other than those defined as high- or low-risk hypertrophic cardiomyopathy</td>
<td>Surgical repair of septal defects</td>
</tr>
<tr>
<td>Previous infective endocarditis</td>
<td>Significant valvular/haemodynamic dysfunction associated with septal defects</td>
<td>Previous coronary artery bypass grafts or stents</td>
</tr>
<tr>
<td>Complex cyanotic congenital heart disease (transposition, tetralogy of Fallot)</td>
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<td>Mitral valve prolapse without regurgitation</td>
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<tr>
<td>Surgically constructed systemic-pulmonary shunts, or conduits</td>
<td></td>
<td>Physiological, functional or innocent murmur</td>
</tr>
<tr>
<td>Mitral valve prolapse with clinically significant regurgitation</td>
<td></td>
<td>Previous Kawasaki disease</td>
</tr>
<tr>
<td>Acquired valvular dysfunction (e.g., rheumatic heart disease) in Indigenous patients</td>
<td></td>
<td>Without valvular dysfunction</td>
</tr>
<tr>
<td><strong>High-risk procedures</strong></td>
<td><strong>Medium-risk procedures</strong></td>
<td><strong>Low-risk procedures</strong></td>
</tr>
<tr>
<td>Extraction</td>
<td>Periodontal probing</td>
<td>Oral examination</td>
</tr>
<tr>
<td>Periodontal procedures including surgery and root planing</td>
<td>Intraligamentary and intraosseous local anaesthetic injection</td>
<td>Infiltration and block local anaesthetic injection</td>
</tr>
<tr>
<td>Replanting avulsed teeth</td>
<td>Supragingival calculus removal/cleaning</td>
<td>Restorative dentistry</td>
</tr>
<tr>
<td>Other surgical procedures (e.g., implant placement, apicoectomy)</td>
<td>Rubber dam placement with clamps (where risk of damaging gingiva)</td>
<td>Supragingival rubber dam placement</td>
</tr>
<tr>
<td></td>
<td>Restorative matrix band/strip placement</td>
<td>Clamping and placement of rubber dam</td>
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<td></td>
<td>Endodontics beyond the apical foramen</td>
<td>Intracanal endodontic procedures</td>
</tr>
<tr>
<td></td>
<td>Placement of orthodontic bands</td>
<td>Removal of sutures</td>
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<tr>
<td></td>
<td>Placement of interdental wedges</td>
<td>Impressions and construction of dentures</td>
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<td></td>
<td>Subgingival placement of retraction cords, antibiotic fibres or antibiotic strips</td>
<td>Orthodontic bracket placement and adjustment of fixed appliances</td>
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<td>Application of gels</td>
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<td></td>
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<td>Intracanal radiographs</td>
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<tr>
<td></td>
<td></td>
<td>Supragingival plaque removal</td>
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</tbody>
</table>