HK12 - What clinical signs have the highest diagnostic accuracy in differentiating seroma from surgical site infection/periprosthetic joint infection?

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Response/Recommendation: Available literature could not provide definitive evidence for a clinical sign that can help clinicians differentiate between postoperative sterile fluid collection, such as seroma, or fluid collection as a result of infection. Thus, SSI/PJI should be suspected in any patient presenting with an abnormal fluid collection.

Level of Evidence: Limited

Delegate Vote:

Rationale:

The postoperative fluid collection remains one of the most common complications after primary or revision arthroplasty surgery. Seromas and hematomas remain the most commonly encountered fluid collections, especially in the early postoperative period. However, periprosthetic infection (PJI) or surgical site infection (SSI) poses the most fearful differential diagnosis of this condition. A high index of suspicion is required to diagnose these three conditions: seroma/hematoma/early infection – either to prevent bacterial seedling of the sterile fluids or to clear out the infection before going into chronicity [1]. Since the clinical examination is the first and the simplest step in the diagnosis journey, defining the specific clinical signs to differentiate sterile from septic fluid collection is crucial.

To answer this question, we systematically reviewed the relevant literature across two search engines –Scopus and PubMed. We imported 513 studies for screening, excluding 16 duplicates, ending in 497 studies screened against title and abstract. We defined the inclusion criteria, including human case series and randomized control trials published after the year 2010, reporting on patients older than 18 years who have a PJI and/or SSI and/or clinical signs of seroma and/or wound complications after hip and/or knee joint arthroplasty surgery. We excluded animal studies, case reports, narrative reviews of literature, studies on children, or reports on non-arthroplasty surgery and skin diseases before 2010. This excluded 495 studies, ending with 12 studies assessed for full-text eligibility [2-13].

The results of our research were not decisive. We were not able to find a clear answer to this question. Most papers reported the number of patients complicated with seromas/hematomas/ PJI/SSI without referring to the clinical signs or symptoms detected and used for the diagnosis [2-13]. We attribute this to the previous successful work done by several bodies to define the specific diagnostic criteria used to detect the PJI. Recent papers rely on these diagnostic criteria owing to their high sensitivity and specificity. However, apart from seeing the pus or purulent discharge, the clinical criteria reported are of poor specificity. Constitutional manifestations such as fever, pain, and local signs and symptoms such as erythema, warmth, and tenderness are all suggestive and should not be relied on [14-19].

<u>Conclusion</u>

Available literature could not provide definitive evidence for a clinical sign that can help clinicians differentiate between postoperative sterile fluid collection, such as seroma, or fluid collection as a result of infection. Relying on previous diagnostic criteria defined by different bodies, we still recommend that clinical signs, apart from witnessing a frank purulent discharge, be considered suggestive and not confirmatory. Confirmation should be made based on further aspiration and fluid analysis.

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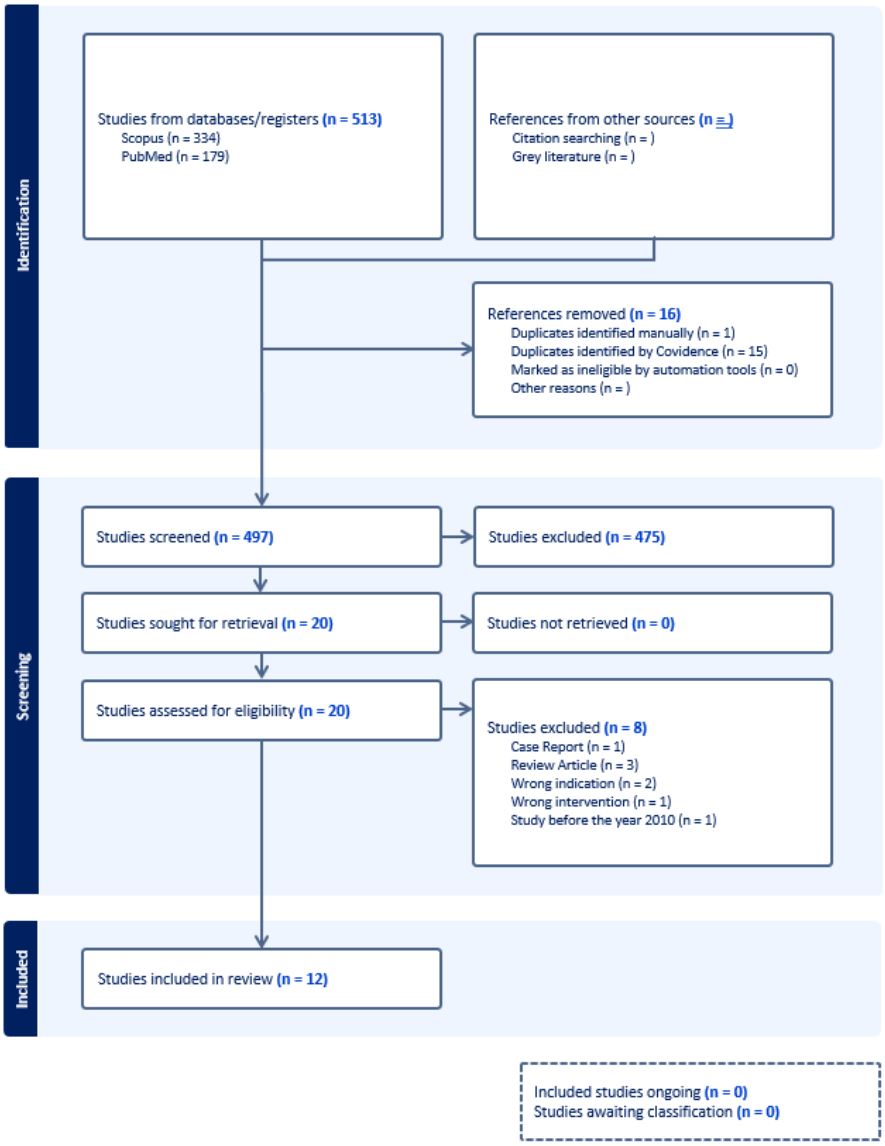
Supplementary materials



We used the following search string on Scopus - TITLE-ABS-KEY ("pathological conditions" OR "Signs and Symptoms" OR "Physical Examination" OR "clinical signs" OR "postoperative symptoms" OR "physical signs" OR "swelling" OR "erythema" OR "pain" OR "drainage" OR "fever" OR "localized warmth") AND TITLE-ABS-KEY ("diagnosis" OR "diagnosing" OR "diagnostic accuracy" OR "diagnostic value" OR "sensitivity" OR "specificity" OR "clinical differentiation") AND TITLE-ABS-KEY ("seroma" OR "serous fluid" OR "serous collection" OR "clear fluid filled mass" OR "clear fluid lump" OR "clear fluid pocket" OR "accumulated clear fluid") AND (TITLE-ABS-KEY ("Prosthesis-Related Infections" OR "periprosthetic joint infection" OR "arthroplasty" OR "joint prosthesis" OR "prosthetic joint" OR "prosthetic implant" OR "artificial joint" OR "orthopedic fixation devices" OR "joint replacement") AND TITLE-ABS-KEY ("infection" OR "bacteria" OR "pathogen")) OR TITLE-ABS-KEY ("Surgical Wound Infection" OR "Postoperative Complications" OR "surgical site infection" OR "orthopedic procedures" OR "orthopaedics" OR "spine" OR "hip" OR "knee"). We used the following MESH terms on PubMed ((((("pathological conditions, signs and symptoms"[MeSH Terms] OR "Signs

and Symptoms"[MeSH Terms] OR "Physical Examination"[MeSH Terms] OR "edema"[MeSH Terms] OR "erythema"[MeSH Terms] OR "pain"[MeSH Terms] OR "drainage"[MeSH Terms] OR "fever"[MeSH Terms] OR "clinical sign*"[Text Word] OR "sign"[Text Word] OR "signs"[Text Word] OR "symptom*"[Text Word] OR "post operative symptom*"[Text Word] OR "postoperative symptom*"[Text Word] OR "physical sign*"[Text Word] OR "swelling"[Text Word] OR "erythema*"[Text Word] OR "pain"[Text Word] OR "drainage"[Text Word] OR "fever*"[Text Word]) AND ("diagnosis"[MeSH Terms] OR "Diagnostic Services"[MeSH Terms] OR "Diagnostic Techniques and Procedures"[MeSH Terms] OR "diagnosis"[Text Word] OR "diagnosing"[Text Word] OR "diagnostic*"[Text Word] OR "diagnostic accurac*"[Text Word] OR "accurate diagnos*"[Text Word] OR "accuracy"[Text Word] OR "accuracies"[Text Word] OR "diagnostic value*"[Text Word] OR "sensitivit*"[Text Word] OR "specificity"[Text Word] OR "specificities"[Text Word] OR "differentiate*"[Text Word] OR "differentiating"[Text Word] OR "clinical differentiation*"[Text Word]) AND ("seroma"[MeSH Terms] OR "seroma"[Text Word] OR "seromas"[Text Word] OR "serous fluid*"[Text Word] OR "serous collection*"[Text Word] OR ("clear fluid*"[Title/Abstract] AND ("accumulat*"[Title/Abstract] OR "pocket*"[Title/Abstract] OR "mass"[Title/Abstract] OR "masses"[Title/Abstract] OR "sac"[Title/Abstract] OR "sacs"[Title/Abstract] OR "sack"[Title/Abstract] OR "sacks"[Title/Abstract]))) AND (("Prosthesis-Related Infections"[MeSH Terms] AND "joint*"[Text Word]) OR "pji"[Text Word] OR (("arthroplasty"[MeSH Terms] OR "Orthopedic Fixation Devices"[MeSH Terms] OR "Joint Prosthesis"[MeSH Terms] OR "arthroplast*"[Text Word] OR "joint replacement*"[Text Word] OR "artificial joint*"[Text Word] OR "joint implant*"[Text Word] OR "implanted joint*"[Text Word] OR "prosthetic joint*"[Text Word] OR "periprosthetic joint*"[Text Word] OR "endoprosthetic joint*"[Text Word] OR "joint prosthes*"[Text Word] OR "joint prosthetic*"[Text Word] OR "periprosthetic joint*"[Text Word] OR "prosthetic joint*"[Text Word] OR "prosthetic implant*"[Text Word] OR "periprosthetic implant*"[Text Word]) AND ("infect*"[Text Word] OR "bacteria*"[Text Word] OR "pathogen*"[Text Word])) OR (("Surgical Wound Infection"[MeSH Terms] OR "Postoperative Complications"[MeSH Terms] OR "ssi"[Text Word] OR (("surger*"[Text Word] OR "surgical"[Text Word] OR "postoperative*"[Text Word] OR "post operative*"[Text Word]) AND ("site*"[Text Word] OR "wound*"[Text Word] OR "incision*"[Text Word]) AND ("infect*"[Text Word] OR "bacteria*"[Text Word] OR "pathogen*"[Text Word]))) AND ("Orthopedic Procedures"[MeSH Terms] OR "orthopedics"[MeSH Terms] OR "orthopaedic*"[Text Word] OR "orthopedic*"[Text Word] OR "spine*"[Text Word] OR "spinal"[Text Word] OR "hip"[Text Word] OR "hips"[Text Word] OR "knee*"[Text Word])))) OR (("seroma/diagnosis"[MeSH Terms] OR "seroma/diagnostic imaging"[MeSH Terms] OR (("seroma"[Title] OR "seromas"[Title] OR "serous fluid*"[Title]) AND ("diagnos*"[Title] OR "sign"[Title] OR "signs"[Title] OR "symptom*"[Title] OR "sensitivit*"[Title] OR "specify"[Title] OR "specificit*"[Title] OR "differentiat*"[Title]))) AND (("Prosthesis-Related Infections"[MeSH Terms] AND "joint*"[Text Word]) OR "pji"[Text Word] OR (("arthroplasty"[MeSH Terms] OR "Orthopedic Fixation Devices"[MeSH Terms] OR "Joint Prosthesis"[MeSH Terms] OR "arthroplast*"[Text Word] OR "joint replacement*"[Text Word] OR "artificial joint*"[Text Word] OR "joint implant*"[Text Word] OR "implanted joint*"[Text Word] OR "prosthetic joint*"[Text Word] OR "periprosthetic joint*"[Text Word] OR "endoprosthetic joint*"[Text Word] OR "joint prosthes*"[Text Word] OR "joint prosthetic*"[Text Word] OR "periprosthetic joint*"[Text Word] OR "prosthetic joint*"[Text Word] OR "prosthetic implant*"[Text Word] OR "periprosthetic implant*"[Text Word]) AND ("infect*"[Text Word] OR "bacteria*"[Text Word] OR "pathogen*"[Text Word])) OR (("Surgical

Wound Infection"[MeSH Terms] OR "Postoperative Complications"[MeSH Terms] OR "ssi"[Text Word] OR (("surger*"[Text Word] OR "surgical"[Text Word] OR "postoperative*"[Text Word] OR "post operative*"[Text Word]) AND ("site*"[Text Word] OR "wound*"[Text Word] OR "incision*"[Text Word]) AND ("infect*"[Text Word] OR "bacteria*"[Text Word] OR "pathogen*"[Text Word]))) AND ("Orthopedic Procedures"[MeSH Terms] OR "orthopedics"[MeSH Terms] OR "orthopaedic*"[Text Word] OR "orthopedic*"[Text Word] OR "spine*"[Text Word] OR "spinal"[Text Word] OR "hip"[Text Word] OR "hips"[Text Word] OR "knee*"[Text Word])))) AND ((1990/01/01:3000/12/12[Date - Publication] AND "english"[Language]) OR ("randomized controlled trial"[Publication Type] OR "controlled clinical trial"[Publication Type] OR "randomized"[Title/Abstract] OR "placebo"[Title/Abstract] OR "drug therapy"[MeSH Subheading] OR "randomly"[Title/Abstract] OR "trial"[Title/Abstract] OR "groups"[Title/Abstract]))) NOT ("animals"[MeSH Terms] NOT "humans"[MeSH Terms])