

Clinical and Radiologic Predictive Factors of Septic Shoulder Arthritis

Ning Lu, Colm McMahon, Jim Wu, J Ni Mhuircheartaigh

BIDMC

Introduction/Problem

Anecdotally the musculoskeletal radiology department have noted a substantial increase in the requests for emergent joint aspirations on in-patients. This was particularly true for shoulder aspirations, which historically were rarely requested. This raises a number of concerns:

- Low diagnostic yield – there was a feeling that the increase in the number of shoulder aspirations had not resulted in a similar increase in the number of positive aspirations, suggesting we may be performing too many of these procedures
- Image-guided joint aspiration is a minimally invasive procedure but is not without the potential for complications. An increase in the rate of emergent aspirations would increase the risk of complications
- Staffing limitations – due to the logistics of BIDMC, adequately trained staff may not be available in a timely fashion to perform emergent joint aspirations and the demands of the additional emergent procedures on in-patients can have significant knock-on effects on providing the routinely scheduled out-patient service

Aim/Goal

To identify clinical and radiologic factors associated with a positive culture during imaging guided shoulder joint aspirations in the hopes of developing a decision tool or guidelines that could allow identification of patients who might benefit from additional imaging, such as MRI, rather than proceeding to joint aspiration

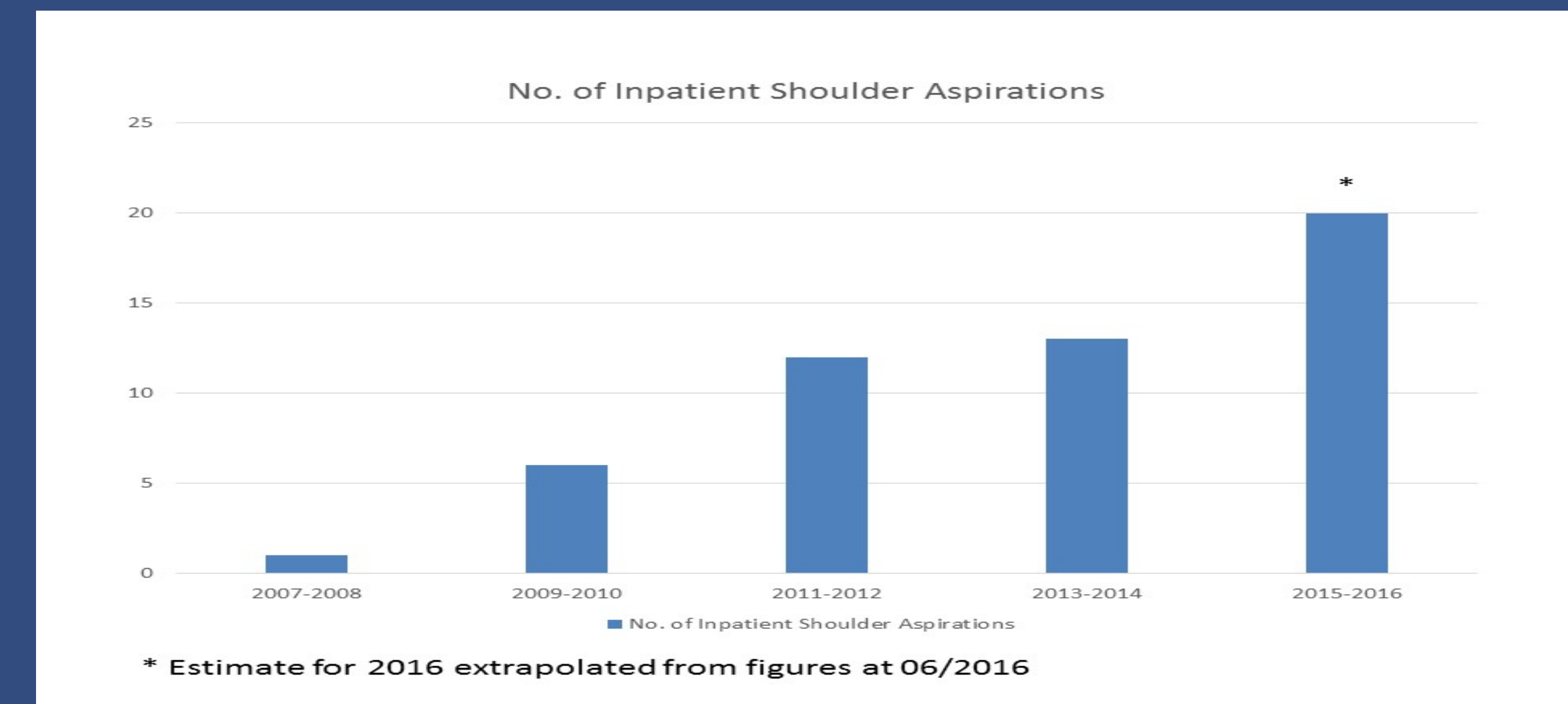
The Team

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- Jennifer Ni Mhuircheartaigh, MD, Department of Radiology, Division of Musculoskeletal Radiology

The Interventions

- Data was collected on the joint aspirations performed on an inpatient basis
- Each case was reviewed to identify emergent shoulder aspirations performed on inpatients
- Data was collected on the following parameters: date of aspiration, age, gender, serum WBC, serum ESR, serum CRP, fever, immunosuppression, IV drug usage, recent intervention, treatment with intravenous antibiotics, prior septic arthritis, synovial fluid volume aspirated, synovial fluid WBC, synovial fluid PMNs, synovial fluid culture, whether the patient was brought to the OR, results of any additional cultures sent.
- Data analysis was performed using the results of the synovial fluid culture as the outcome of interest

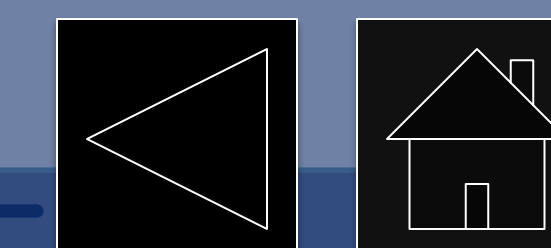
Results/Progress to Date



Initial review of in-patient emergent shoulder aspirations confirmed our observation that the number of procedures had increased substantially.

For more information, contact:

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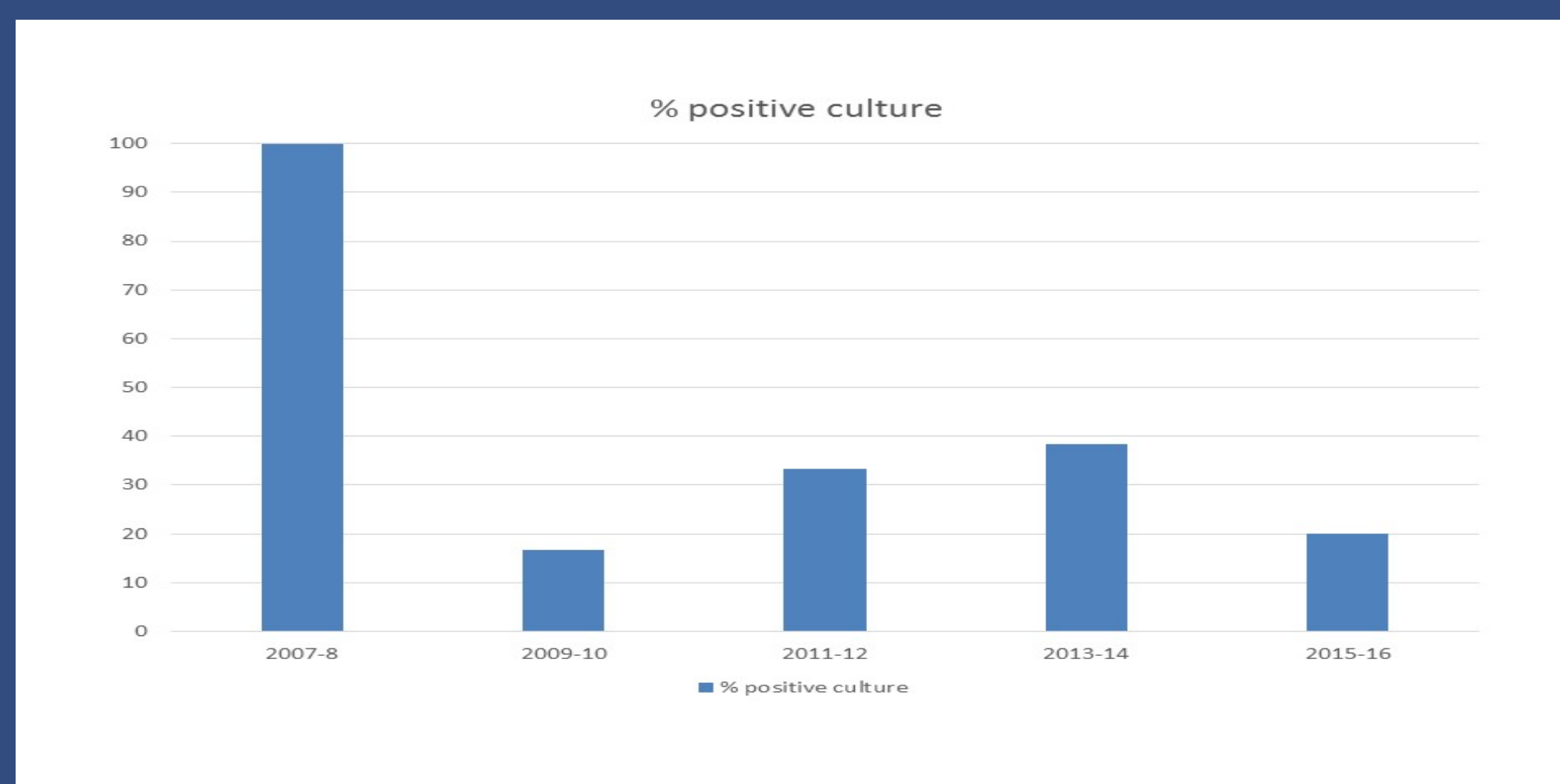


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More Results/Progress to Date



Variable	Mean Culture -ve	Mean Culture +ve	P value
Aspirate WCC	8049	92,978	<0.001
% PMN	57.2%	86.1%	0.004
Volume aspirated	2	4.5	0.26

Variable	Culture -ve	Culture +ve	P value
Reaspirate	18/33	4/14	0.103

The rate of positive cultures on shoulder aspirations varied from year to year but no clear trend was seen

The preliminary results of the emergent shoulder aspirations (WCC, PMNs of synovial fluid) were significantly associated with positive cultures

Variable	Culture -ve (n=33)	Culture +ve (n=14)	P value
Immunosuppression or DM	13 (39.4%)	9 (64.3%)	0.118 (X ²)
IV drug user	8 (24.2%)	2 (14.3%)	0.7 (Fisher's)
Recent interventions	1 (7.1%)	2 (14.2%)	0.208 (Fisher's)
Other septic joints	13 (39.4%)	5 (35.7%)	0.812 (X ²)
Recent antibiotics	19 (57.6%)	10 (71.4%)	0.372 (X ²)
Recent fever	11 (33.3%)	8 (57.1%)	0.127 (X ²)

Variable	Culture -ve (n=33)	Culture +ve (n=14)	P value
WCC ≥11	17	6	0.587
ESR ≥ 20 (n=31)	20/21	7/10	0.087 (Fisher)
CRP ≥ 100	16/29	9/13	0.391 (X ²)
CRP ≥ 150	14/29	8/13	0.426 (X ²)
ESR <70	8/21	5/10	0.701 (Fisher)

Lessons Learned

- In keeping with our anecdotal observations, there has been a substantial increase in the number of emergent image-guided shoulder aspirations
- Despite the increase in the number of cases, the overall rate of positive cultures has not changed significantly.
- This finding likely reflects a change in practice within the orthopaedic service with an increased preference for image-guided shoulder aspiration over blind (landmark guided) shoulder aspiration

Next Steps

- Multivariate analysis of the collected data will be performed in order to try to identify a subgroup of patients in whom an interventional procedure might be deferred in favour of advanced imaging such as MRI; for example, if patients have a normal serum WCC, normal ESR, normal CRP, no immunosuppression and no fever.

No clinical factors or pre-procedural laboratory studies were significantly associated with positive cultured from image guided shoulder aspiration

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