

# Efficacy of MRI imaging versus reports on surgical decision making in the shoulder

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## Disclosures

**All authors** certify that they have **no commercial associations** (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted manuscript.



# Background

- Classic surgical decision making in shoulder surgery is comprised of a combination of clinical examination and radiologic imaging
- MR-imaging has increased significantly in the last decade
- MR-images are used separately by orthopaedic surgeons and radiologists the latter generating an MRI report
- AIM: Identify the relative value of the MRI report in current shoulder surgeon practices routine and surgical decision making of shoulder disorders.



# Methods

- Canadian Shoulder and Elbow Society (CSES) Orthopaedic Association
  - 93 active shoulder-specialised orthopaedic surgeons
- Anonymous web-based survey in August and September 2020
  - 31 short questions
- Ethics approval from the University of British Columbia (CREB H20-01321)
- Aim: Identify the use of MR-imaging and reports in the management of shoulder disorders and the surgical decision process



# Results

- 30 of 93 (32.25%) active CSES fellowship-trained orthopaedic surgeons completed survey
- Basic data:
  - Majority 40-60 years old (70%; n=21) & male (n = 25; 83.3%)
  - All: At least one year of fellowship training
  - Average practice time as full qualified surgeon: 17.6 ± 8.9 years
  - Monthly clinics with 50-200 shoulder specific patients (n = 28; 93.3%)



# Results

- Completed MRI scans **prior** first visit
  - $50.7 \pm 25.5\%$  rotator cuff pathology
  - 25 – 33.5% shoulder instability, frozen shoulder, glenohumeral OA, ACJ
- MRI scans **ordered by shoulder surgeon** in cases of
  - $55.4 \pm 29.7\%$  rotator cuff pathology
  - $48.2 \pm 33\%$  shoulder instability
- Additional imaging ordered
  - CT scans: Glenohumeral OA  $66.4 \pm 34.9\%$ ; Shoulder instability  $41.9 \pm 31.1\%$
  - Ultrasound: Rotator cuff pathology  $33.6 \pm 30.8\%$



# Results

Question	Q11 – Image review of MRI in cases of ... ?		Q12 - Reading the MRI report in cases of ... ?	
	Yes	No	Yes	No
a) Rotator cuff pathology?	96.55%	3.45%	89.66%	10.34%
b) Shoulder instability?	96.55%	3.45%	89.66%	10.34%
c) Frozen shoulder?	89.66%	10.34%	89.66%	10.34%
d) Glenohumeral arthritis?	93.10%	6.90%	79.31%	20.69%
e) ACJ-Pathology?	89.66%	10.34%	79.31%	20.69%

Q13 - If No, why do you not read the report?	
Answer	%
often false positive	42.86%
often false negative	0.00%
takes too much time	0.00%
often not at hand	14.29%
other	42.86%
Total	100%

Q14 - If Yes, why do you read the report?	
Answer	%
do not want to miss something	15.38%
to double-check one's personal diagnosis	61.54%
because it helps my surgical decision	3.85%
other	19.23%
Total	100%



# Results

- Ranking 5 factors influencing surgical decision making (pathology dependent\*):
  - 1) Patient history: 45.3 – 55.3%**
  - 2) Physical examination: 23 – 42.2%**
  - 3) Other imaging (U/S, CT scan, X-ray): 3.1 – 23.2%
  - 4) MRI images: 2.6 – 18.1%
  - 5) MRI report alone: 0 – 1.6%



Q25 Would you <u>solely</u> decide for surgery based on the MRI report in an ambiguous patient history or examination (without seeing the actual images) in cases of ...?		
Question	Yes	No
a. Rotator cuff pathology (including calcific tendinitis & biceps pathology)?	7.41%	92.59%
b. Shoulder instability?	7.41%	92.59%
c. Frozen shoulder?	7.41%	92.59%
d. Glenohumeral arthritis?	11.11%	88.89%
e. ACJ-Pathology?	7.41%	92.59%

\*Pathologies: Rotator cuff pathology; shoulder instability; glenohumeral OA; frozen shoulder, ACJ-pathology



# Results

- Approx. **90% would not make a surgical decision** in ambiguous cases of shoulder disorders (History + clinical exam + MRI report) **without seeing the actual MRI images**
- MRI scans have been used by some surgeons to postpone or counsel against a surgery particularly in cases of RC pathology (57.7%) and frozen shoulder (34.6%)
- Overall, MRI scans are over-ordered:
  - Rotator cuff pathology - 53.9%
  - Shoulder instability - 73.1%
  - Frozen shoulder - 88.5%
  - GHOA - 88.5%
  - ACJ pathology - 92.3%
- **Majority of CSES surgeons feel comfortable reviewing shoulder MRI scans and making surgical decisions** without the help input of a radiologist (**82.3 – 93.1%**)



# Conclusions

- Surgical decision making is based on a combination of factors and varies according to pathology
- Orthopaedic surgeons are comfortable reviewing shoulder MRI scans without necessarily reading the MRI report prior to a surgical decision
- MRI scans are becoming an increasingly important part of surgical management in shoulder pathologies but should not be used without assessment of patient history and/or physical examination



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