O15-1

Preoperative Canal Bone Ratio, and Canal Bone Filling Are Related To Stress Shielding Around Radial Head Protheses. An International Multicentric Study Elbow

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INTRODUCTION. Stress shielding around radial head prostheses is common, and independent of stem design. Few studies have enumerated risk factors for stress shielding. The MoPyC implant is an uncemented long-stemmed radial head prosthesis that obtains satisfactory primary uncemented fixation but has also been associated with significant stress shielding. We sought to assess if the preoperative canal-bone ratio (CBR), canal flair index (CFI), and canal-bone fill (CBF) were associated with the presence of stress shielding after a radial head arthroplasty.

METHODS. A total of 90 radial head arthroplasties (59 women and 31 men; mean age, 56.64 years (IQR45.5-65.75)) were included in this international multicentric study (6 centers). Clinical (MEPS and QuickDASH) and radiologic measurements were analyzed at a mean follow-up of 5.6 years (IQR 3.3-7.7)). the radiologic measurement incuded Preoperative CBR, CFI and CBF, as well as the postoperative stress shielding and cortical hypertrophy.

RESULTS. Stress shielding was noted in 24 patients (27%). Cortical hypertrophy was identified in 28 (31%). Mean Preoperative CBR, CFI, and CBF were 0.55, 1.78 and 2.11, respectively. Mean Quickdash and MEPS were 19.37 and 83.57. Preoperative CBR (OR5.13 (IC95 1.19-5.71); p=0.05) and CBF (0.82 (IC95 0.11-0.97);p=0.03) were significantly associated with the presence of stress shielding. Implant revision was required in 4 patients (Implant dislocations (3), and overstuffing (1)). There were no cases of painful loosening.

CONCLUSION. Preoperative canal bone ratio (CBR), and canal bone fill (CBF) were foiund to be independently associated with stress shielding around radial head prostheses. In addition, our data support the frequency of stress shielding around the Mopyc implant.

一般 15「橈骨頭置換術」

2月4日（土）11:35〜12:30
第2会場（山形テルサ 1F テルサホール）

English & Japanese Oral Session 15 "Radial head Arthroplasty"

Feb. 4th (Sat) 11:35〜12:30
Room 2 (Yamagata Terrsa 1F Terrsa Hall)

O15-2

橈骨頭粉砕骨折に対する人工橈骨頭挿入術36例の治療成績

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Clinical outcome of 36 radial head prostheses for comminuted radial head fractures

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「背景」
橈骨頭粉砕骨折に対する人工橈骨頭挿入術の治療成績の報告は少ない。演者らは第31回の本学会で17例の人工橈骨頭挿入術の治療成績を報告した。今回は、さらに症例数・経過観察期間を増やし治療成績を報告する。
「対象と方法」
2005年から2021年に橈骨頭粉砕骨折に対して、人工橈骨頭挿入術を行い術後6か月以上の経過観察が可能であった36例を対象とした。受傷時年齢は平均63（36〜84）歳、男性12例、女性24例、経過観察期間は平均36.5（6〜120）か月であった。Mason-Morrey分類のType3が19例、Type4が17例であった。使用した機種はEVOLVE prolineが20例、ARHSが10例、rHEADが5例、CRF Ⅱが1例であった。検討項目は最終観察時の肘・前腕可動域、X線所見でのstem周囲の骨透亮像、術後合併症とした。
「結果」
肘関節可動域は伸展平均-10.6度、屈曲平均129度、前腕可動域は回内平均69.1度、回外平均80.7度であった。単純X線では、13例にstem周囲の透亮像を認めた。合併症は、疼痛を伴うloosening によるimplant抜去1例、遅発性尺骨神経障害を1例、重度の拘縮1例、深部感染1例、異所性骨化を4例、変形性関節症性を6 例に認めた。
「考察」
治療成績は比較的良好であり、少なくとも高齢者の粉砕骨折に対しては積極的に行ってよい手術方法であると考えられた。Stem周囲の透亮像を36％の症例に認めていたが、有症状で抜去に至ったのは1例であった。

O15-3

Osteosynthesis and radial head arthroplasty achieve comparable and favorable results in terrible triad injury: a systematic review using propensity score matching

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Background
Terrible triad injuries of the elbow are complex injury patterns which have historically been problematic for surgeons. Replacement of the radial head (RHA) has increased, with a substantial rise in the presence of elbow instability. The driving forces behind this increase in arthroplasty utilization appear to include the favorable outcomes of RHA in older adults and the short-term failure rates reported for open reduction internal fixation (ORIF). The terrible triad literature reports data across wide ranges of patients ages and treatment allocation for the radial head is commonly based on fracture severity. These observations raise the question of selection bias which can hinder comparative efficacy.
Our objective was to perform a systematic review comparing RHA and ORIF in terrible triad injury using propensity score matched analysis.
Methods
Study inclusion required a table with individual patient reporting of the following: patient age, patient gender, follow-up term, radial head fracture classification, and a numeric Mayo Elbow Performance Score (MEPS). Propensity score matching provides statistical analysis based on the matching of individual patient covariates in order to better control potential confounding factors.
Results
For the overall sample, RHA (N=77) and ORIF (N=97) demonstrated favorable outcomes with low rates of revision at a mean follow up of 36 months. Propensity score matched analysis of 16 pairs of Mason III fractures yielded no significant differences between RHA and ORIF for MEPS (p=0.90, RHA 91.2, ORIF 89.4) and Disabilities of the Arm Shoulder and Hand scores (DASH) (p=0.80, RHA 13.2, ORIF 15.4).
Conclusion
Mason III fractures in terrible triad injury demonstrated favorable clinical outcomes with low rates of revision for ORIF and for RHA. Additionally, MEPS and DASH scores were not significantly different between these treatment options. The aggregated results reinforce the increasing body of evidence for acute surgical management of terrible triad injuries of the elbow.

O15-4

The comparative performance of radial head prostheses in patients younger than and older than 50 years: a systematic review

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Background
Patient age may play a role in the surgeon's decision to perform radial head arthroplasty (RHA). Though large sample reports have detailed outcomes of RHA for a mean age under 50 years, the age ranges are widely distributed. Patient outcomes are not uniform across a broad age distribution. Treatment decisions should be evaluated within the confines of a narrower age bracket. An understanding of clinical outcomes for radial head replacement in younger adults will provide value for guiding treatment decisions. We performed a systematic review comparing the clinical outcomes for RHA in patients younger and older than 50 years, and when RHA was performed as a primary procedure and as a secondary procedure within the same age groups.

Methods
PubMed was queried for RHA articles which delineated individual patient data for age, surgical treatment, and appropriate outcome metrics. Articles were grouped based on patient age of under 50 and over 50 years and within those age groups, based on the arthroplasty being performed as a primary or as a secondary procedure.

Results
There were no significant differences between the under 50 and the over 50 groups for Mayo Elbow Performance Score (p=0.79) and for implant revision/removal (p=0.32). In the under 50 group, RHA done as a primary procedure had significantly higher (p=0.001) mean MEPS than RHA done as a secondary procedure. In the over 50 group, relative risk was 2.39 (95% CI 2.12 - 2.69) for implant revision/removal (p=0.11) when comparing primary and secondary procedures.

Discussion
RHA in patients under 50 years demonstrated satisfactory short-term outcomes (mean 48 months) which are comparable to outcomes in patients over 50 years. Our findings provide guidance to surgeons who face a multifaceted decision when encountering younger adult patients with radial head fracture patterns that may not be amenable to fixation. Awareness of the age-specific performance of radial head implants is an important component of the decision for surgical treatment.

O15-5

橈骨頭骨折に対する人工骨頭置換術の治療経験

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Clinical outcomes of the operative treatment for radial head replacement of the radial head fracture

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【目的】橈骨頭の粉砕骨折や橈骨頚部偽関節では人工橈骨頭置換が選択されることがある。今回、当科で上記骨折あるいは偽関節に対して施行した人工橈骨頭置換術の術後成績を後ろ向きに検討した。
【方法】2014年より2021年の間に当科で人工橈骨頭置換術を施行し、術後半年以上経過観察が可能であった橈骨頭粉砕骨折6例、橈骨頚部偽関節1例の計7例を対象とした。すべて女性で、右肘3例、左肘4例、平均年齢77.6（70-87）歳であった。骨折例は、Mason-Morrey 分類Ⅲ型2例、Ⅳ型4例であった。偽関節例は、橈骨頚部骨折後の1例であった。初回手術での使用インプラントは、Anatomic Radial Head System（ARHS）が4例、EVOLVE3例であった。合併損傷は尺骨近位端骨折3例、肘頭骨折2例、Essex Lopresti 骨折1例であった。可動域、JOA-JESスコア、ステム周囲骨透亮像の変化、再手術の有無を調査項目とした。
【結果】平均経過観察期間は20.9（9-40）ヶ月であった。最終経過観察時の可動域は屈曲123.6±13.6°、伸展-10±3.8°であった。JOA-JESスコアは90.1±7.8であった。ARHSの4例中3例で、骨透亮像の増大傾向を認めた。対して、EVOLVEの3例では、骨透亮像を認めるものの増大傾向は乏しかった。2例でインプラントの再置換術を行った。
【考察】porous coatingされたセメントレスステムであるARHSは、高齢者を対象とした場合、ステムの弛みが増大する傾向があった。症例が少なく、経過観察期間も短いため明言はできないが、EVOLVEのようなnoncementでintentional loose-fitタイプの人工橈骨頭が高齢者では望ましいと考えている。

O15-6

Press-fit type人工橈骨頭の治療成績

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Clinical and Radiological Outcomes of Press - Fit Radial Head Arthroplasty

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＜目的＞
橈骨頭粉砕骨折の治療において、骨接合が不可と判断されれば、人工頭骨頭置換術が選択される。本邦ではanatomicalな形状を有するpress-fit typeの人工頭骨頭が2016年から使用可能となった。今回の研究目的は、当院におけるpress-fit typeの人工橈骨頭置換術の臨床評価及びレントゲン評価を明らかにすることである。
＜対象と方法＞
対象は2017年以降、当院にて人工橈骨頭置換術を行った8例8肘とした。平均手術時年齢は43.7歳、平均経過観察期間は16.3ヶ月であった。使用インプラントは、Anatomic Radial Head System®（Acumed）で、手術の際は、橈骨頚部に平行となるようにインプラントを設置した。これらの症例に対して、最終診察時の肘関節屈伸可動域と前腕回内外可動域、及び、レントゲン像（lucent thickness、橈骨軸に対するステム挿入角、頸部骨吸収長、異所性骨化の有無）の評価を行った。
＜結果＞
平均値で結果を示す。可動域は、伸展-20.0°屈曲112.5°回内64.0°回外71.0°であった。また、レントゲン像では全例でインプラントの緩みを認めず、lucent thicknessは0であった。橈骨軸に対するステム挿入角は正面14.6°側面2.3°、頚部骨吸収長は4.5mmであった。異所性骨化は2例で認められた。
＜考察＞
海外の先行研究では、Press-fit typeの人工橈骨頭が10-20％の割合で緩みを認め、failureとなった症例では側面像でのステム挿入角が平均14°とfailureとならなかった症例（平均4.9°）と比較し有意に高値であったとの報告がある。今回の調査では緩みを認めた症例は1例もなかった。また、側面像でのステム挿入角は平均2.3度と14度を大きく下回っていた。Press-fit typeの人工橈骨頭は橈骨頚部の解剖軸に平行に設置できた場合、短期の経過においては、緩みなく経過すると考えられた。