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Evidence over time: Has the MSTS moved towards higher level of evidence?

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Background:

In the early 1990s, evidence-based medicine (EBM) became widely accepted as a new paradigm for medical practice.[1] Compared to medical specialties, however, surgical fields have been slow to incorporate EBM into clinical care and education.[2] The incorporation of Levels of Evidence (LOE) by several major orthopaedic surgery journals sought to address this deficit by emphasizing the importance of high-level studies.[4] In 2008 the prospective, randomized-controlled SPRINT trial was published by an Orthopaedic trauma collaborative, demonstrating that high-level collaborative surgical studies were both feasible and clinically significant.[5] In keeping, the LOE in clinical research produced by the orthopaedic trauma community has improved significantly. Both orthopaedic trauma and orthopaedic oncology are specialties that focus on non-elective cases and there is some overlap in clinic practices with respect to metastatic bone disease. Therefore research progress in these specialties could be expected to move forward in parallel.

Questions/Purpose:

The objective of this study was to determine whether the distribution of levels of evidence of clinical research studies presented at major academic meetings in the field of musculoskeletal oncology has changed over time and is consistent with the trends in orthopaedic trauma research.

Patients and Methods:

Abstracts from the Musculoskeletal Tumor Society (MSTS) and the Orthopaedic Trauma Association (OTA) annual meeting podium presentations from 2005 through 2014 were organized into a single database. Three independent reviewers evaluated a total of 1403 abstracts. The three reviewers judged the study type (therapeutic, prognostic, diagnostic, economic, basic science) and level of evidence for each abstract.[3,4] The interobserver agreement of the three reviewers was calculated using Fleiss' Kappa.[5] The distributions of study types and LOEs over time for each of the MSTS and OTA annual meetings were evaluated by Pearson Chi-Squared test.

Results:

After exclusion of basic science studies, 1222 clinical abstracts were included (577 from MSTS and 645 from OTA). There was substantial agreement between reviewers with respect to study type and LOE (Kappa=0.762 and 0.673, respectively).[5] The overall distribution of study types for abstracts from MSTS and OTA were similar with the majority being therapeutic and prognostic (Figure 1). Of the MSTS therapeutic studies, 2 of 376 (0.5%)

were level I, while 74.7% (281/376) were level IV (Figure 2C). In contrast, the therapeutic studies from OTA represented a 7-fold higher proportion of level I studies [3.42% (14/409)] and only 31.7% (130/409), less than half of that of MSTS, were level IV case series (Figure 2D). Over the 10-year period evaluated, there was no change in MSTS LOE for both overall (Figure 2A, $p=0.128$) and therapeutic (Figure 2C, $p=0.356$) studies. In contrast the overall LOE of OTA presentations increased over the 10-year period (Figure 2B, $p<0.01$). The proportion of OTA comparative therapeutic studies (LOE I through III) versus non-comparative studies (LOE IV) increased significantly over time (Figure 2D, $p<0.021$). However, no such progression in therapeutic studies was noted for MSTS with a static proportion of non-comparative studies (LOE IV) over time ($p=0.101$).

Conclusions and Future Directions:

The distribution of LOE of podium presentations at the MSTS annual meeting has remained unchanged over the last decade, while the LOE of OTA annual meeting presentations has improved over the same time frame. Specifically, at the OTA fewer case series have been presented in favor of higher-level therapeutic trials. This in part is due to multiple active collaborative trauma groups in the USA, Canada and Europe. Although orthopaedic oncology research is not exclusively presented at MSTS meetings, collaboration among MSTS members could mirror that of OTA members as our Society progresses forward towards higher-level collaborative studies.

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Figure 1

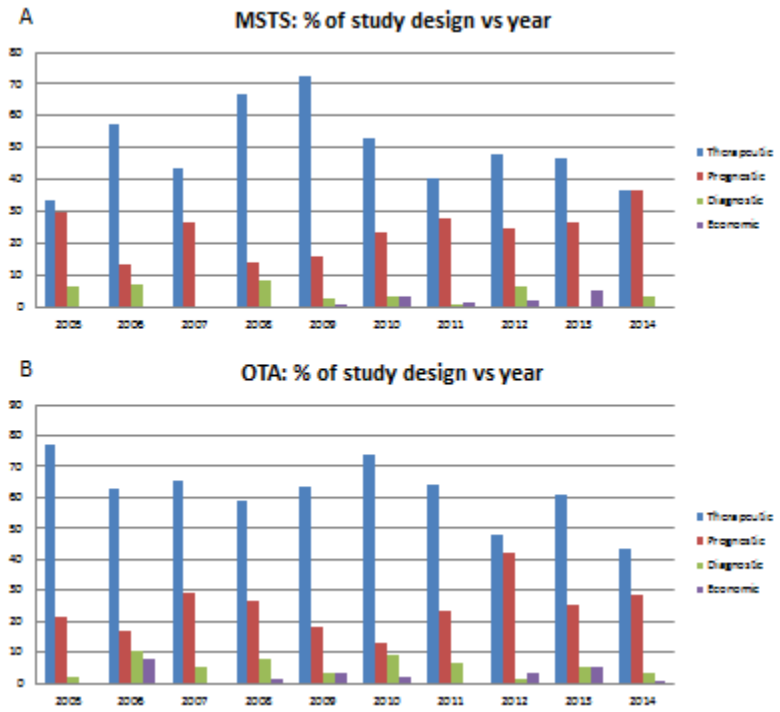

Figure 2