

found to have a significantly higher Frankel score at follow-up though the remaining groups (B and C), presented no significant difference between their average scores. The number of patients who improved their preoperative neurological condition showed no significant difference between the subgroups; indeed, all subgroups benefited from surgical treatment with significant improvements in functional status and quality of life. Three recurrences were recorded, all in group A. Axial topography, level of the lesions and preoperative symptoms, including impairment of the sphincter functions proved no statistical interaction.

Conclusions: Elderly might not be a contraindication for surgery treatment in SMs, due to important improvements in functional status and quality of life in this subgroup of the population. Older patients can benefit from prompt assessment and early surgery in case of acute onset, with a complication rate not higher than in younger patients.

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Current state of spinal robotics – an AO Spine Survey

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Oral e-Poster Presentations - Booth 3: Spine 7 (Tumors), October 15, 2024, 12:40 PM - 2:10 PM

Background: Robotics in spine surgery has gained popularity in recent years since the indications and implementation tremendously expanded from pedicle screw instrumentation to surgical resection of the spinal column, augmentative procedures, and complex deformity and revision cases. We designed a survey to provide a landscape assessment regarding the adoption of robotics in spine surgery and to create educational awareness for this topic through the AO Spine regions.

Methods: AO spine members were invited to fill out a 27-question online questionnaire regarding the utilization of navigation and spinal robotics in practice between October 25th and November 13th, 2023. The survey was created using the SurveyMonkey platform (<https://www.surveymonkey.com>; SurveyMonkey Inc., San Mateo, CA, USA) and distributed by the AO Spine email platform and further promoted via social networks. All statistical analyses (descriptive statistics, Pearson Chi-Square tests) and generation of all graphs were performed using SPSS Version 29.0.1.0 (IBM SPSS Statistic).

Results: We received 424 responses from AO Spine members (response rate = 9.9 %). The participants were on average 43.10 years old and the majority stated to be board-certified orthopedic surgeons (46 %, n=195) or board-certified neurosurgeons (32%, n=136). Respondents from all continents and primarily university hospitals (49.5 %, n=210) or private hospitals/practices (28.5%, n=121) with most frequently an average rate of annual instrumentation procedures (48%, n=31-120 instrumentations/year) took part. While 42% of all participants (n=177) stated to place pedicle screws with navigation assistance, only 16 % (n=68) indicated the use of robotic assistance. Only 21 % (n=89) of all participants stated they had used a robot during a real patient procedure for spinal instrumentation in their departments with a significant difference based on the geographic origin of the respondents as most of the robotic users came from Europe, Asia & Arab countries, or North America (p=0.006). Further assessment revealed that only 11 % (n=47) of all surgeons use a spinal robot frequently (1-2x/week) while 5% (n=23) possess one but don't use it at all. Although 35 % (n=150) plan to acquire a robotic system in the future, a similar number of participants (36 %, n=153) stated they don't want/need one from a current perspective. On the question of why they have not implemented a spinal robot in their department yet, most participants (77%, n=301) stated that high acquisition costs are a major issue while further most common reasons were insufficient benefit of spinal robots (28%, n=109) and high enough precision of spinal navigation systems (20%, n=79). Although most robotic users believe that robots increase precision during instrumentation procedures (69%, n=55) and that they are useful tools (72%, n=57), they could not indicate a clear benefit regarding the reduction of intraoperative complications (54%, n=43) and increase in surgical efficiency (43%, n=34). Most respondents believe robotics might make an impact on the outcome in minimally invasive surgery (67%,

n=264), adult (62%, n=244), or pediatric (50 %, n=196) deformities. Future innovations, which most respondents (70%, n=271) wished for were primarily more integrated surgical options and the integration of artificial intelligence (55%, n=211). Most surgeons (43 %, n=166) stated they would consider a shared company investment with guaranteed use of implants or other products by the hospital as an investment option to acquire a robotic system.

Conclusions: Although the hype for robotics recently increased, it still appears that robotic systems are not standard equipment for spine surgeons due to high acquisition costs and limited usability. Further developments appear to be mandatory to justify a broader utilization.

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Exploring the Gut Microbiome and Mycobiome in Glioblastoma Patients

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Oral e-Poster Presentations - Booth 2: Neuro-Oncology 1 (GBM & malignant gliomas), Neuro-Oncology 2 (GBM & malignant gliomas), October 15, 2024, 12:40 PM - 2:10 PM

Background: Glioblastoma (GBM), the predominant malignant brain tumor in adults, continues to pose significant clinical challenges, with a persistently poor prognosis despite aggressive therapeutic approaches. This study aims to unravel potential distinctions in the gut microbiome and mycobiome compositions between primary GBM patients and healthy control subjects.

Methods: In a prospective case-control study, we enrolled 23 GBM patients and 23 control participants. Rectal swabs were collected from GBM patients prior to surgery, and DNA extracted from these samples underwent 16S and ITS sequencing. Additionally, fluorescence in situ hybridization (FISH) analysis, employing universal eukaryotic and fungal probes, was performed on GBM sections.

Results: Preliminary results illuminate intriguing variations in the microbiome and mycobiome profiles between GBM patients and their healthy counterparts. Notably, GBM patients exhibited lower abundance of Bacteroidaceae and Lachnospiraceae, while higher levels of Candida and Cryptococcus were observed compared to the control group. FISH analysis did not reveal the presence of bacteria or fungi in GBM sections.

Conclusions: These preliminary findings offer valuable insights into the distinctive microbiome landscape in GBM patients, shedding light on microbial and fungal imbalances that may play a role in the pathogenesis of this aggressive brain tumor. The observed alterations in microbial composition could potentially influence therapeutic strategies, as identifying key microbial players may open avenues for novel treatment modalities aimed at improving clinical outcomes for GBM patients.

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Embolization of Middle Meningeal Artery in Patients with Chronic Subdural Hematoma: a Monocentric Experience

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Oral e-Poster Presentations - Booth 4: Trauma and Critical Care 2, Trauma and Critical Care 3, Trauma and Critical Care 4, October 15, 2024, 12:40 PM - 2:10 PM

Background: The endovascular treatment of middle meningeal artery (MMAe) for Chronic Subdural Hematoma (cSDH) is undergoing analysis of efficacy and effectiveness with several trials. Many series reported satisfactory results in terms of recurrence. Debated issue is the definition of effectiveness in terms of

radiological or clinical results. An overall rate of failure as recurrence is reported about 5%. The primary endpoint of this study is to estimate the effectiveness in terms of decreasing of the hematoma thickness, while secondary endpoints are reduction of the midline shift, recurrences and complications rate such as acute bleeding, acute thrombosis. The percentage of patients with clinical improvement at 3-days and 1-month follow-up after embolization was also estimated.

Methods: The retrospective study included 50 patients who underwent MMAe for cSDH from July 2020 to October 2023. The embolizations included were either primary or secondary to surgery or previous embolization. Clinical and radiological follow-up data were included, either pre and post procedural. In the CT scans performed, hematoma thickness and midline shift were observed, as well as the presence of bilaterality and collection density.

Results: 2 patients were excluded because they had too short follow-up time. Among the remaining patients, 38 were male, 12 were female. The mean age was 75y. There were 24 primary and 26 secondary embolizations. Primary statistical analysis showed correlation between thickness reduction on CT 3 months after embolization. Secondary analysis showed correlation between midline reduction 3 months after embolization with lower incidence of postoperative complications and greater clinical improvement. The percentage of patients undergoing retreatment is 8%, while a percentage of 90.9% showed clinical improvement.

Conclusions: MMAe in selected patients with cSDH could be proposed as safe procedure. Improvements of radiological features can relate to clinical improvement. The future results of ongoing trials can better explore further indications for this procedure.

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Comparison of Outcomes and Recurrence Rates in Patients Undergoing Single or Double Burr Hole Surgery for the Treatment of Chronic Subdural Hematoma

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Oral e-Poster Presentations - Booth 4: Trauma and Critical Care 2, Trauma and Critical Care 3, Trauma and Critical Care 4, October 15, 2024, 12:40 PM - 2:10 PM

Background: Chronic subdural hematoma (CSDH) is a very common disease of elderly patients in treated by neurosurgeons, with incidence is in general population between 8.2 to 17.6/100 000/ year, with the triple incidence among patients older than 80 years. One of the most common complications of the surgery of CSDH is the recurrence which is reported from 0 to 30% in different studies.

Methods: A retrospective study was conducted on patients treated for CSDH between January 2018 and December 2022. The diagnosis of CSDH was confirmed through preoperative CT or MRI of the brain. Patients underwent either single or double burr hole surgery based on the neurosurgeon's decision. Preoperative and postoperative brain CT scans, along with clinical outcomes, were analyzed.

Results: A total of 88 patients were included in the study, with 102 burr hole surgeries performed. Among these, 49 patients received single burr hole surgery, while 53 patients underwent double burr hole surgery. Recurrence of CSDH occurred in 8.8% of cases, with no significant difference observed between the groups. Of note, single burr hole surgery demonstrated comparable efficacy to double burr hole surgery in terms of subdural reduction and occurrence of pneumocephalus, while exhibiting fewer complications and shorter hospitalization.

Conclusions: Single burr hole surgery for CSDH is an effective intervention, showing comparable outcomes in terms of subdural reduction and pneumocephalus occurrence compared to double burr hole surgery. Additionally, it is associated with fewer complications and shorter hospital stays.

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Re-Resection For Recurrent Glioblastoma – Does Timing Matter?

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Oral e-Poster Presentations - Booth 2: Neuro-Oncology 1 (GBM & malignant gliomas), Neuro-Oncology 2 (GBM & malignant gliomas), October 15, 2024, 12:40 PM - 2:10 PM

Background: Surgery for recurrent glioblastoma (GBM) offers potential for prolonged patient survival, but the optimal timing of re-resection after tumor suspicion and its effects on post-surgical outcomes remain unclear.

Methods: A retrospective analysis was conducted on patients undergoing first re-resection for recurrent WHO grade 4 IDH-wildtype GBM. Post-surgical neurological deterioration and survival outcomes were compared between patients undergoing early surgery (within 3 weeks) after suspected recurrence and those receiving surgery later than three weeks. Volumetric analyses were utilized to assess tumor burden and location.

Results: The study comprised 103 consecutive patients (mean age: 59 years; 64 males and 39 females) undergoing first re-resection for recurrent GBM from 2018 to 2022. Gross total resection (GTR) was achieved in 93 patients (91%) at initial diagnosis and in 96 patients (93%) at repeat surgery. Intraoperative MRI-guided resection was performed in 84 (82%) cases, with 5-ALA applied in 8 (8%) cases and neuromonitoring used in 14 (14%) cases. The median time interval between first and second resection was 341 days (IQR 343 days), while the median time interval between suspected tumor recurrence and re-resection was 20 days (IQR 23 days). Surgery was delayed beyond 3 weeks after suspected recurrence in 49 cases, primarily due to salvage chemotherapy/targeted therapy, suspicion of pseudo-progression, or patient preference. Delayed surgery did not correlate with increased rates of immediate or permanent post-operative neurological deterioration. Median survival after repeat surgery was 220 days, with no significant difference between early and late surgery groups. Volumetric analyses showed no significant differences in tumor volume or eloquence between patients receiving early or late surgery.

Conclusions: Timing of surgery for suspected first recurrence of GBM did not affect functional outcomes or post-surgical survival. Satisfactory rates of post-operative neurological deficits and survival were achieved in this contemporary cohort of patients undergoing repeat surgery for recurrent GBM.

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The Influence of Frailty score on the treatment of Glioblastoma patients: Insights from a Retrospective Multicenter Analysis

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Oral e-Poster Presentations - Booth 2: Neuro-Oncology 1 (GBM & malignant gliomas), Neuro-Oncology 2 (GBM & malignant gliomas), October 15, 2024, 12:40 PM - 2:10 PM

Background: Frailty is defined as a condition marked by diminished physiological capacity and a decreased ability to withstand stressors, resulting from the cumulative decline associated with aging. It is linked to a higher likelihood of illness and serves as a significant indicator of the risk of death. Few data show the relationship of frailty with adverse outcomes and survival after elective craniotomy. Limited evidence exists on how frailty impacts negative outcomes and survival rates following elective craniotomy in case of Glioblastoma. It is crucial to pinpoint risk factors that identify patients at a higher risk for complications or death during and after surgery to guide surgical choices and subsequent