Surgical multidisciplinarity for precision medicine: the challenge for the future

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Multidisciplinary care has been shown to improve patient outcomes, and interprofessional collaboration has been shown to improve one's medical knowledge. Multidisciplinary interventions in the field of surgery are designed to address a specific problem occurring in a particular patient population and/or within the context of an individual hospital system. The importance of multidisciplinarity and interdisciplinarity at all levels, including clinical oncology, craniofacial trauma, and brain abscess caused by dental peri-implantitis, is well established. The challenge for future research is to further develop and validate medical team performance assessment instruments; this will help improve medical and surgical team training efforts and aid the design of clinical work systems supporting effective teamwork and safe patient care.

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Tree et al. (2) highlighted the importance of multidisciplinarity and interdisciplinarity at all levels, including clinical oncology. Harmonious interactions between oncologists, surgeons, radiologists and radiotherapists, and other members of multidisciplinary teams, including biomedical engineers, are essential for optimising patient care in oncology (2). This multidisciplinary approach is particularly important in the current landscape,

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in which standard-of-care approaches to cancer treatment are evolving towards highly targeted treatments, precise image guidance and personalized cancer therapy (13-18).

The surgical management of complex patients with the craniofacial oncological disease is a challenge that must be conducted by trained, experienced and multidisciplinary teams (neurosurgeon, maxillofacial surgeon, ENT surgeon and plastic surgeon). For example, a wide resection with craniectomy and reconstruction with microvascular free tissue transfer provides safe and reliable treatment of recalcitrant invasive scalp skin cancers, when performed by an experienced team (19-32). Communication across different specialities remains a core element of cancer care. Communication skills are important in establishing a good relationship with patients, but in the increasingly complex field of cancer treatment, oncologists and surgeons need to be equally skilled at communicating with and learning the art of those focused on other specialities (2).

Similarly, the treatment of facial fractures also requires a multisystem approach, as all bony and soft tissue injuries should be diagnosed, and reconstitution of all tissue layers should be performed, if possible (13, 22, 30, 33-41). The advancement of technology has enabled rigid fixation to become the standard of care for the fixation of most facial fractures (42). More precise stability and fixation of fractures have become possible, and intermaxillary fixation is used less frequently. Well planned incisions minimize scarring. Adequate exposure, precise reduction, and stable fixation remain the hallmarks of the treatment of facial fractures (43-46). The main principles of middle face trauma are an accurate and complete lesions evaluation; a mixed surgery team with an ENT, maxillofacial, neurosurgeons, and ophthalmology surgeon (42).

Complex spine surgery carries a high complication rate that can produce suboptimal outcomes for patients undergoing these extensive operations; however, multidisciplinary pathways introduced at multiple institutions have demonstrated promising potential for reducing the burden of complications in patients treated for complex spinal diseases (47-56). Similarly, in patients with brain abscess caused by dental peri-implantitis, multidisciplinary treatment, performed by neurosurgeons, dentists and maxillofacial surgeons (57-68), includes broad-spectrum antibiotics, craniotomy for abscess drainage, sinus surgery and the removal of the implant (69-80).

Although many multidisciplinary care teams have been described in the field of surgery, few studies to date have examined whether or not these team-based interventions are generally cost-effective (1,81-84). Davis et al. (1) examined cost savings attributable to multidisciplinary care across all surgical fields, concluding that multidisciplinary surgical care is beneficial in patient and provider outcomes and its cost-effectiveness. In addition, hospital length of stay has been proposed as a key indicator of appropriate resource use in the North American healthcare system (81, 82), whereas a prolonged hospital length of stay is associated with poor clinical outcomes and increased costs to patients (82, 83). Sterbenz et al. (84) examined the implementation of business strategies in clinical research to increase productivity and help a research team remain competitive, summarizing the model of an effective research team and presenting an approach that can be used to derive strategies that foster productivity in a surgical research setting.

Literature on teams identified shared mental models, mutual respect and trust and closed-loop communication as the underpinning conditions required for effective teams. Educational interventions can promote a better understanding of the principles of teamwork, help staff understand each other's roles and perspectives and help develop specific communication strategies (85). Well-designed multidisciplinary teams tend to optimize perioperative care for all involved parties. Therefore, improving surgical care should employ multidisciplinary teams to promote quality and cost-effective care.

Future research challenges further developing and validating medical team performance assessment instruments; this will help improve medical and surgical team training efforts and aid the design of clinical work systems supporting effective teamwork and safe patient care (86-131).

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