high-output heart failure and, ultimately, death may occur.
1 Typically, management represents a challenge since it may include a wide variety of options such as embolization, laser therapy, sclerotherapy and surgical resection but may lead to significant morbidity. 2 In extreme situations, lesions considered otherwise untreatable have been reported to respond to a new alternative treatment: mammalian target of rapamycin inhibitors (mTORI) 1,3,4.

METHODS AND RESULTS: We report a case of giant complex vascular malformation treated with sirolimus followed by surgical resection. A 19-year old woman was referred to our department with long history of large giant soft tissue mass compromising the entire left hemithorax causing pain and crippling discomfort. Lesion was considered unresectable. CT-scan showed massive vascular slow-flow lesion that invaded deeper structures including abdominal musculature, the peritoneal cavity with extension around the anterior and posterior ribs, diaphragm and anterior mediastinum. Estimated volume was 8400 mL. Because previous treatments were ineffective, therapeutics with oral sirolimus was considered. Therapy was well tolerated. None of commonly reported side events were seen (gastrointestinal or bone marrow toxicity, rashes, mucositis, headaches). 3 By the end of the second year into therapy, the mass volume substantially decreased in size and CT-scan demonstrated extensive shrinkage as well as a much less infiltrative pattern with surrounding structures. Decision to operate was based on the significant reduction in the volume of the mass associated with the clinical finding of increased elasticity in surrounding tissues, favoring a subtotal or near-total excision of the lesion and primary reconstruction. Six months after surgery, patient was asymptomatic and had improved quality of life.

CONCLUSION: Management of complex vascular malformation remains a challenging problem. Surgical treatment must be related to elevated recurrence rates, while sclerotherapy alone offers limited results and current medical therapy is associated with considerable side effects. 1,3 The mTORI emerged as a promising new medical treatment option for vascular anomalies, particularly for vascular malformations. Refractory or in progression lesions are subject to additional benefit. mTORIs should be considered part of the armamentarium in the management of these conditions. Further studies are needed to better determine effects and to compare sirolimus to newer mTORI.

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REFERENCES:
1. Hammill AM, Wentzel M, Gupta A, et al. Sirolimus for the treatment of complicated vascular anomalies in children. *Pediatr Blood Cancer*. 2011; 57: 1018–24.
2. Goldenberg DC, Hiraki PY, Caldas JG, et al. Surgical treatment of extracranial arteriovenous malformations following multiple embolizations: outcomes in a series of 31 patients. *Plast Reconstr Surg*. 2015; 135: 543–52.
3. Iacobas I, Burrows PE, Adams DM, et al. Oral rapamycin in the treatment of patients with hamartoma syndromes and PTEN mutation. *Pediatr Blood Cancer*. 2011; 57: 321–3.
4. Trenor CC. Sirolimus for refractory vascular anomalies. *Pediatr Blood Cancer*. 2011; 57: 904–5.
5. Adams DM, Trenor CC, Hammill, et al. Efficacy and Safety of Sirolimus in the Treatment of Complicated Vascular Anomalies. *Pediatrics*. 2016; 137: 1–10

The Canadian Contribution to the Global Plastic Surgery Literature: A 10-Year Bibliometric Analysis

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INTRODUCTION: Research is an integral part of plastic surgery residency training and practice, and provides a foundation for knowledge advancement in our field. Furthermore, it improves patient care by facilitating the delivery of evidence-based therapies. As research is dynamic, and is often contingent on funding sources, it is important to continuously assess output. To our knowledge, this is the first study to describe Canadian plastic surgery research trends.

MATERIALS AND METHODS: Data was obtained from the Scopus Database and articles published in the top general and specialty plastic surgery journals were included. All articles written in English and related to document-types ‘articles’, ‘reviews’, and ‘letters’ published over a 10-year period (2006–2015) were tracked. Articles were then individually analyzed, and only those who had a first and/or corresponding author with an appointment at a Canadian institution were included in the final analysis.

RESULTS: Between 2006 and 2015, a total of 29,950 original articles were identified, with Canada being the 10th highest contributing country. A total of 753 Canadian articles, reviews, and letters met our inclusion criteria and were included in the final analysis. Publications followed a bimodal distribution, peaking in 2008 (n=82) and again in...
There was an average of 3.53 (SD = 1.95) authors per publication. There was a 2.58:1 predominance of male to female first authors and a 5.62:1 predominance of male to female corresponding authors. The journals most frequently published in were Plastic and Reconstructive Surgery (35%), Canadian Journal of Plastic Surgery (23%), and Journal of Plastic, Reconstructive and Aesthetic Surgery (11%). The top producing institutions were the University of Toronto/University Heath Network, Dalhousie University, and McMaster University, respectively. The most frequently studied domains of plastic surgery were craniofacial (20%), hand and upper extremity (18%), and breast (12%).

CONCLUSION: Canada continues to be a leading contributor of high impact research in plastic and reconstructive surgery. This study provides novel insight into a number of pertinent trends, which may be used to determine funding patterns, understudied domains of plastic surgery, domains most likely to be funded, and changes in publication practices.

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The Classification and Prognosis of Periocular Complications Following Cosmetic Filler Injection

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INTRODUCTION: Common side effects during hyaluronic acid filler injections are typically mild and reversible, but several reports of blindness have received attention.1-3 The present study focused on orbital symptoms combined with blindness, aiming to classify affected patients and predict their disease course and prognosis.

METHODS: From September 2012 to August 2015, 9 patients with vision loss after filler injection were retrospectively reviewed. Ptsosis, ophthalmoplegia, and enophthalmos were recorded over 6-month follow-up, and patients were classified into 4 types according to periocular symptom manifestation. Additionally, 2 cadaveric eyeballs were anatomically studied to investigate anatomical evidence for the mechanism of enophthalmos development.

RESULTS: Two patients were categorized as Type I (blindness without ptosis or ophthalmoplegia), two patients as Type II (blindness and ptosis without ophthalmoplegia), two patients as Type III (blindness and ophthalmoplegia without ptosis), and three patients as Type IV (blindness with ptosis and ophthalmoplegia). During the follow-up periods, there was no recovery from blindness, but ptosis and ophthalmoplegia fully recovered except in one Type IV patient with mild strabismus. At 6 months after filler injection, an average of 1-mm enophthalmos developed in Type II and III patients, and 1.7-mm enophthalmos in Type IV patients. Anatomical investigation revealed previously undiscovered branching to periorbital adipose tissue from ophthalmic arteries.

CONCLUSION: The present study includes previously unpublished information about orbital symptom manifestations and prognosis combined with blindness due to retinal artery occlusion after cosmetic filler injection. Information about symptom progression and prediction of injury will help clinicians when managing such devastating complications.

REFERENCES
1. Beasley, K.L., M.A. Weiss, and R.A. Weiss, Hyaluronic acid fillers: a comprehensive review. Facial Plast Surg, 2009. 25(2): p. 86–94.
2. Gladstone, H.B. and J.L. Cohen, Adverse effects when injecting facial fillers. Semin Cutan Med Surg, 2007. 26(1): p. 34–9.
3. Kwon, S.G., et al., Ischemic oculomotor nerve palsy and skin necrosis caused by vascular embolization after hyaluronic acid filler injection: a case report. Ann Plast Surg, 2013. 71(4): p. 333–4.
4. Park, K.H., et al., Iatrogenic occlusion of the ophthalmic artery after cosmetic facial filler injections: a national survey by the Korean Retina Society. JAMA Ophthalmol, 2014. 132(6): p. 714–23.
5. Li, X. and J.-j.L. Le Du, A Novel Hypothesis of Visual Loss Secondary to Cosmetic Facial Filler Injection. Annals of plastic surgery, 2015. 75(3): p. 258.

The Effectiveness of Early Combined Fractional CO2 and Pulsed Dye LASER Treatment after Scar Revision

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INTRODUCTION: Scars are one of the important complications of the wound healing process that cause physical,