We appreciate the comments [1] of Drs Mangold and Ankersmit on our article [2]. Our group proved that genipin fixation is a novel alternative to conventional glutaraldehyde fixation, and the addition of decellularization, organic solvent treatment and detoxification prevent calcification of glutaraldehyde/genipin-fixed bovine pericardium. We also found that the titer of anti-α-Gal(Galα1-3Galβ1-4GlcNAc-R) antibodies (immunoglobulin G) increases after the implantation of bovine pericardium to rabbit, and in vivo calcification results are consistent with the increase in anti-α-Gal antibodies titer [2].

Although the cause and significance of the xenoreactive antibody response between the different species in α-Gal concordant animal model have not been exactly known, some possible suggestions may exist: (i) by a species-specific expression of these conjugated compounds including α-Gal epitopes; (ii) a tissue-specific expression of these conjugated compounds including α-Gal epitopes and (iii) the differences in the fine specificity of natural anti-Gal antibodies in various species which recognize various ‘facets’ of the α-Gal epitope in its three-dimensional form.

A species-specific expression of these conjugated compounds including α-Gal epitopes has been well demonstrated for so long. Thyroglobulin, fibrinogen and immunoglobulins from various species express varying amounts of Galα1-3Galβ1-4GlcNAc residues between 0.01 and 11 residues per molecule [3]. Rabbit red blood cells contain a range of glycolipids of varying lengths that terminate with the Galα1-3Galβ1-4GlcNAc-R structure. These glycolipids vary in size by increments of five monosaccharides, and each increment forms an additional branch. Although rat did not contain Galα1-3Galβ1-4GlcNAc neutral glycosphingolipids in the kidney, pig and sheep contained sialic acid-containing glycolipids (gangliosides) with the Galα1-3Galβ1-4GlcNAc-R structure, most likely the same branched, ganglioside identiﬁed in bovine red blood cells [4]. Thymus tissue from sheep, pig and rabbit also contained a range (compounds with 5–11 sugars) of neutral glycolipids terminating with the Galα1-3Galβ1-4GlcNAc-R structure demonstrating a species-specific expression of these compounds. Although the kidney and thymus from sheep, pig and rabbit express Galα1-3Galβ1-4GlcNAc-R glycolipids, these glycolipids were not detected in brain tissue demonstrating a tissue-specific expression of these compounds [5]. The detailed analysis of N-linked glycans from porcine kidney demonstrated that Galα1-3Galβ1-4GlcNAc-R termini were found on a variety of complex bi-, tri- and tetra-antennary N-glycans [6].

As we evaluated recently the immune response in the implantation of bovine pericardium to mice in which the α1,3-galactosyltransferase gene was knocked out (Gal−/− mice), the titer of anti-α-Gal antibodies much increased. But interestingly, we also observed the increase in anti-α-Gal antibodies in wild-type mouse and rat as well as rabbit, although much less than Gal−/− mice. We think that further transplantation or implantation experiments are needed to validate more exact xenoreactive immunologic responses between the different species.

REFERENCES

We read with great interest and enthusiasm the paper by Lischke et al. [1] on the use of a new biodegradable stent in the treatment of stenosis after lung transplantation.

The concept that a stent could act for a certain period of time and then disappear is a very promising concept in airway stenting. This first report in humans is in itself of high scientific value even if the studied population is very limited and if biodegradable stents made of bio-absorbable polydioxanone do not seem to prevent recurrences as suggested by the fact that new stent placement was necessary in almost all of the patients after degradation of the initial stent. This may be due to the fact that the stent degradation is too fast and that this kind of stenosis may require longer stent placement duration. In comparison, post-tracheostomy or post-intubation tracheal stenosis, another type of benign airway stenosis, requires an average of 18 months with a silicone stent in place, to be definitely cured in almost 70% of the cases (no recurrence at 1 year after removal) [2].

The absence of silicone stents as potential alternative to metallic stents in this study is questionable for us. Indeed, we recently published our experience using silicone stents to treat anastomotic stenosis following lung transplantsations [3]. We treated 23 anastomotic airway stenoses with the Dumon-type stents. Mean stent duration was 266 days (range: 24–1407 days). Stent-related complications were of mild to moderate in severity, and were appropriately managed endoscopically. Successful stent removal was achieved in 16 of 23 cases (69.5%) without recurrence of stenosis.

Our conclusions fully support the idea of non-permanent stenting in anastomotic complications after lung transplantsations and in benign airway stenoses in general. This does not seem to be really the case with biodegradable stents, given that new stents are regularly required in the studied population.

It is always useful to be reminded of the FDA recommendations regarding metallic stenting in benign tracheal stenosis (www.fda.gov/MedicalDevices/Safety/AlertsandNotices/PublicHealthNotifications/UCM062115) and the fact that non-fully covered metallic stents can actually worsen the primary stenosis [4] and may be very difficult to remove after placement [5]. Silicone stents are still considered as the gold standard in airway stenting [6] and any new type of stent should be compared with them, even biodegradable stents. As the future of airway stents clearly evolves towards active stents (drug-eluting stents, biodegradable, radioactive stents) [6], the study by Lischke et al. [1] is clearly a landmark study in this field and the authors should be acknowledged for that. Many new studies will be probably published soon with new applications and new kinds of degradable stents, the debate is just starting.

REFERENCES


LETTER TO THE EDITOR RESPONSE

Reply to Dutau et al.

David Vondrys** and Robert Lischke*  

* Congenital Cardiac Service, Department of Cardiac Surgery, Medical University Innsbruck, Innsbruck, Austria  

** Department of Surgery, University Hospital Motol, Prague, Czech Republic

Received 21 October 2011; accepted 4 November 2011

Keywords: Lung transplantation • Bronchial stenosis • Metallic stents • Silicone stents • Biodegradable stents

We thank Dr Dutau et al. [1] for their comments regarding our article ‘Novel biodegradable stents in the treatment of bronchial stenosis after lung transplantation’ [2]. In our previous experience, there was a place for both metal and silastic stents in tracheal and bronchial stenosis management, as the authors suggest.

Silicone stents were used at our institution in the era before biodegradable stenting. Between January 1997 and January 2005, we performed 98 lung transplants in 67 patients (36 single-lung transplants and 31 bilateral-lung transplants). Four bronchial anastomotic complications requiring stenting (4.1%)...