Platelet-rich plasma in endoscopic sinus surgery

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Abstract
The author designed a study to assess the healing properties of platelet-rich plasma (PRP) after endoscopic sinus surgery in 30 patients with bilateral and symmetrical chronic rhinosinusitis that was refractory to medical management. At the conclusion of each operation, PRP was introduced into the middle meatus of a randomly chosen side, while the other side was treated normally and served as a control. Patients were followed until both sides healed. After 13 operations, follow-up evaluations demonstrated no benefit to the use of PRP, and the study was terminated early. In general, both sides healed quickly and uneventfully as expected. There appears to be no advantage to the use of PRP in endoscopic sinus surgery.

Introduction
The use of platelet-rich plasma (PRP) was introduced to the oral surgery community by Whitman et al in 1997. Since that time, a number of both positive and negative articles have appeared in the oral surgery literature regarding the ability of PRP to promote healing in the setting of bone grafts, usually in preparation for dental implants or for elevation of the maxillary sinus floor. In a 2001 review of the literature, Schmitz and Hollinger concluded, "At this time, basic research does not strongly endorse the ability of PRP to promote healing." In a more recent review, Sanchez et al concluded that "there is clearly a lack of scientific evidence to support the use of PRP in combination with bone grafts during augmentation procedures." On the other hand, in 2004, Marx came to a more positive conclusion and found that PRP also enhanced soft-tissue, mucosal, and skin healing.

PRP is thought to work via the degranulation of the alpha granules in platelets that contain a number of growth factors believed to be important in early wound healing. These growth factors are thought to accelerate healing by increasing cellular proliferation, matrix formation, osteoid production, and collagen synthesis.

In this article, the author reports the results of a study to determine whether PRP has a positive impact on healing in endoscopic sinus surgery.

Patients and Methods
The author originally planned to recruit 30 patients who had bilateral, essentially symmetrical, chronic rhinosinusitis that was refractory to medical management, a condition that would make them candidates for endoscopic sinus surgery. Patients with asymmetric disease or any other confounding condition were excluded from consideration.

The surgery was performed in the usual fashion. At the conclusion of each procedure, PRP was instilled into the middle meatus on one randomly chosen side, while the other side was treated in the normal manner, thereby making it possible for each patient to serve as his or her own control. The Harvest Technology (Plymouth, Mass.) system was used exclusively, and its protocol followed exactly.

Patients were followed until complete mucosalization had occurred in the middle meatus on both sides, and the time to that event was recorded.

The study protocol was approved by the Institutional Review Board of the Keck School of Medicine of the University of Southern California.

Results
It became obvious early that there was no benefit to the use of PRP, and the author halted the study after 13 patients had been enrolled. Seven patients had PRP instilled on the right side and 6 on the left side (table). In 9 patients, healing was equal on the two sides. In the remaining 4 patients, there appeared to actually be a disadvantage to using PRP.

Discussion
Most articles in the modest body of literature on PRP for surgical wound healing have appeared in oral-maxillofacial surgery journals; a smattering have been published in the plastic surgery literature.

In 1998, Marx et al showed that combining PRP with...
autogenous bone in mandibular continuity defects resulted in significantly faster radiographic maturation and histomorphometrically denser bone. Schmitz and Hollinger, however, questioned both their results and their theory. Fennis et al performed a study on goats in which they resected the angle of the mandible and removed the marrow from the resected segment to form an autogenous bone tray. They then made cortical perforations to allow for vascular ingrowth. The tray was packed with autogenous iliac crest, with or without the addition of PRP, and rigidly fixed. X-rays were taken 3, 6, and 12 weeks postoperatively and evaluated in a blinded fashion. The authors reported that the use of PRP appeared to enhance bone healing considerably. In a rabbit study, Aghaloo et al failed to show that PRP conferred any significant benefit. Jakse et al studied the effect of PRP added to autogenous bone grafts for sinus lift procedures. They found a 3 to 4% increase in bone generation with PRP; the difference was not statistically significant. They described the regenerative capacity of PRP as being of “quite low potency.”

In one of the few studies that have appeared outside the oral surgery literature, Man et al described the use of PRP in cosmetic surgery. In another, Adler and Kent reported their experience with face-lifts. Finally, Abuzeni and Alexander reported their experience with PRP and autologous fat transfer in cosmetic surgery.

The results of the small study reported herein do not support the use of PRP in endoscopic sinus surgery. Perhaps a larger study would show a small benefit, but it is doubtful. Perhaps PRP would be beneficial in settings where rapid, uneventful healing is not expected. For example, PRP might be useful in major head and neck surgery, particularly in patients who have previously received chemoradiation or who have experienced major facial trauma. However, even if PRP were to be beneficial in these cases, obtaining a sufficient quantity would be problematic. With current harvesting techniques, 20 ml of a patient’s blood yields only 2 to 3 ml of PRP. Considerably more than that would be needed to cover the wound in an anec dissecti. Further research is needed to address these issues.

### References