

PRP with Small Intestine Submucosa Layer (SIS)

Case Study 1



Patient with left foot plantar ulcers and infection with osteomyelitis. Initial injury in June 2012 and surgical debridement in July 2012. Treated with IV antibiotics. Therapy and foot PRP application on 8/22/12.

Case Study 2



85-year-old gentleman who was admitted April 2012 after he had injury which was a form related injury. He had multiple problems including pneumonia, his fracture, left chest and his fracture and also his wrist disorder that was serious. His bones to the back and left wrist NPWT. He was discharged from hospital on 6/12 after rehab stay. He had PRP application on 6/12. Patient had tendon exposed on the dorsal aspect of the hand and culture grew mrsa. Had 4x IV culture applied 5/28/12 but unfortunately they pulled apart and on 7/5/12 had probe culture applied to approximate the margin to approximate the wound region. Completed course of IV antibiotics for MRSA subsequent and eventually healed in August.

PRP with Small Intestine Submucosa Layer (SIS)

Background: The effective use of autologous platelet rich plasma (aPRP) to expedite wound healing has been limited because retaining the aPRP at the wound site is technically challenging. In this study, an extracellular matrix composed of small intestinal submucosa (SIS) was used to protect the aPRP from premature breakdown by local enzymes and to keep the aPRP sequestered on the wound.

Methods: A retrospective study of 40 patients was performed. All patients underwent treatment for partial or full-thickness wounds and had either treatment with aPRP (n=30) or treatment using SIS+aPRP (n=10). Most of the wounds were surgical wounds but chronic ulcers of varying etiology, osteomyelitis wounds, and traumatic wounds were also included.

Analysis: Wounds in the control group were treated with aPRP and covered by a non-adherent secondary dressing to maintain a moist wound environment. Patients in the SIS+aPRP group were treated with tailored SIS grafts soaked in aPRP and subsequently implanted without suturing into the wounds. An absorbable matrix rich in keratin protein was used to prevent the SIS from moving. Thirty-one of 40 patients underwent only one application of aPRP. In the control group, eight patients required more than one aPRP application, while in the SIS+aPRP group, one patient required two applications.

Results: Mean patient age was 58 years (Range:24-85). Average wound age prior to aPRP treatment for the control group was 83 days (Range:14-187) and the mean time to achieve full wound closure was 102±72 days. Average wound age for the SIS+aPRP group was 62 days (Range:15-131) and the average time to heal was 59±21 days. With the exception of three patients in the control group (2 failures and 1 non-compliance), all patients achieved full wound closure.

Discussion: Results suggest that aPRP is a safe and valuable adjuvant therapy for wound healing and adding SIS may lead to faster wound closure.

Case Study 6



72 year old diabetic gentleman with Stage 4 non-malignant CA presents to hospital with foot ulcers, ulcers and generalized malaise on 5/28/12. Active with these ulcers with most recent ulcer approximately 1 day before symptoms. Blood culture grew osteomyelitis and initial culture and was producing infection of right foot confirmed by CT scan. I & D done for acute foot pain progressive osteomyelitis. Clindamycin and receive chemotherapy until wound healed per Cheung. PRP with SIS done 6/12 to expedite healing. Continued healing during care healed by August 2012.

Case Study 7



82 year old non-surgical diabetic with history of left toe amputation admitted to hospital with infection after debridement of surgical wound. Treated with IV antibiotics. SIS+aPRP treatment was initiated during 7/12/12. On 8/12/12 following removal of antibiotic (IV) was still about the wound. Further debridement was performed and was eventually discharged from hospital. Continued oral course of IV antibiotics and was eventually discharged from hospital following to right foot. PRP and SIS used to expedite healing. Wound healed on 8/12/12. Complete healing by August 2012.

Case Study 3



Seen first in January 2010 and again in July 2011 with foot infection. Wound opened up in October 2011 and foot Podiatric procedure to heal the ulcer at that time. He was initially seen by Infectious disease at tertiary facility. Had IV antibiotics and an 8200 developed fever, chills and was admitted to Wilson 2/10/12 and surgery was done by Podiatry. Culture showed MRSA and osteomyelitis. Wound later admitted to Lima hospital where he was seen by Dr. Ruppel for these new foot problems and eventually transferred to LAC and foot surgery done by Podiatry. Debridement of IV antibiotics for bone infection. His dorsal foot infection opened up and developed right heel ulcer. The ulcer 9/12. Offloaded in a cam walker boot. Eventually healed 11/01/12 of scab removal and good epithelialization over the dorsal foot bone and right heel positive.

ID	Age	Gender	Location/etiology	ISD	Date of Onset or PRP in days	Age of wound prior to PRP in days	Date of initial PRP applications	Total Number of PRP applications	Dates of Repeat PRP	Date healed	Number of Days from PRP to Healed
18859	45	MALE	foot/Osteomyelitis		7/15/2012	38	8/22/2012	1		10/4/2012	43
18555	85	MALE	wrist/hand exposed		4/14/2012	53	6/4/2012	1		9/4/2012	90
1897	59	MALE	foot/Osteomyelitis		2/10/2012	82	5/9/2012	1		7/10/2012	82
18688	39	FEMALE	limb/Osteomyelitis		5/19/2012	47	6/27/2012	1		7/27/2012	30
18634	71	MALE	foot/gangrene		5/28/2012	16	6/13/2012	1		8/20/2012	69
1973	52	MALE	foot/Osteomyelitis		2/9/2012	132	6/20/2012	1		8/27/2012	68
18449	75	FEMALE	oculum/deubuit		3/17/2012	81	6/4/2012	2	6/20/2012	8/6/2012	61
1897	43	FEMALE	neck/surgical		4/29/2012	26	7/25/2012	1		8/20/2012	27
18730	48	MALE	foot/Osteomyelitis		3/6/2012	57	5/2/2012	1		7/19/2012	78
1787	65	MALE	leg/hypertical		4/9/2012	93	7/10/2012	1		8/19/2012	33

BASIC DATA ON THE TYPES OF WOUNDS

Patient #	Date	WBC	L%	M%	G%	WBC	HS/L	L%	M%	G%	CD34+CD45+	Total CD34+
18859	8/22/2012	125	227	38.2	47.1	85	74.4	41.1	8.5		8800	82000
1878	4/20/2012	4.8	42.4	26.2	33.4	9.4	70.1	42.1	14.7		780	6340
18449	4/20/2012	8	23.6	20.5	53.9	28.7	65.8	12.4	26		485	3480
18634	6/13/2012	4.7	48.3	12.4	39.1	7.2	73.3	12.6	10.1		225	2420
1897	6/8/2012	9.1	14.4	16.3	63.3	8.6	46.9	9	21.1		190	3500
1897	5/9/2012	7.1	23.5	10.3	66.2	12.5	64.3	16.3	23.3		780	7640
1897	5/2/2012	1.5	30.7	20.7	48.6	14.1	65.5	13.2	24.3		400	4000
1897	7/25/2012	4.1	30.4	12.6	57	11	72.2	1.6	12.1		100	1200
1787	7/10/2012	8.7	22.1	19.3	58.6	9.9	76.6	11.1	18.3		88	8100
18809	8/22/2012	7.4	42.1	27.8	30.1	7.8	65.3	10.7	28		3940	4240
Mean		7.8	30.2	19.7	50.1	9.1	68.4	12.7	19.9		525	5575
+SD		2.6	10.8	6.8	11.5	6.0	6.7	1.9	6.6		300	3629

THE WHITE BLOOD CELL COMPOSITION OF THE PRP PRODUCT CONTAINS 95% OF THE MONONUCLEAR CELLS IN THE WHOLE BLOOD SAMPLE. THIS IS INDICATIVE OF THE PRESENCE OF STEM/PROGENITOR CELLS.

Patient #	Date	Hct %	WBC	HS/L	PLT	Volume	Hct %	WBC	HS/L	PLT	Yield %
18888	6/27/2012	34.4	125	520	12	6.9	18.9	1999	615		
1897	6/20/2012	30.8	43	176	8	6.6	9.4	891	675		
1849	6/20/2012	45.9	8	339	8	12.9	29.7	2487	81		
18634	6/13/2012	16.5	4.7	227	11	4.1	7.2	175	624		
1897	6/8/2012	37.3	9.1	409	10	23.3	8.6	1381	532		
1897	5/9/2012	35.9	7.1	254	11	14.2	12.5	926	64.8		
1897	5/2/2012	39.1	7.5	278	10	5.4	16.1	979	587		
1897	7/25/2012	37.4	6.1	346	10	8.9	11.1	733	657		
1787	7/10/2012	33.2	8.7	348	10	12.3	9.9	1005	48.6		
18809	8/22/2012	35.9	7.4	322	11	3.1	7.8	263	39.5		
Mean		35.7	7.8	278	11	10.2	11.1	112	613		
+SD		3.4	2.6	124	1.1	7.1	6.9	647	132		

PRP YIELD: THE MEAN PLATELET CONCENTRATION USED IN THIS STUDY HAS BEEN SHOWN TO BE IDEAL FOR SUPPORTING ANGIOGENESIS. (TRANSFUSION 2009;49:771-778)

Unique advantages of PRP in wound care

- Restore healing balance.
- Promotes homing mechanism.
- By itself and in combination with SIS (small intestine submucosa) PRP acts as an adjuvant therapy in wound healing.
- Need for repeat debridement is reduced.
- Cost effective as other treatments / interventions are stopped.

Case Study 4



39 year old female who initially had heel problems with her calcaneus and proximal arthritis and had heel and lumbar surgery done in 2009. A debridement procedure was performed with debridement which required protracted surgery for over 10 hours. Post operatively continued to have drainage from the lumbar area and secondary to protracted drainage and non-healing caused after her lumbar surgery on 6/12, decision was made to have prosthesis material sub. Patient otherwise did have the done on 6/27/2012. PRP + SIS application on 6/27/12. Discharged secondary ulcers done on the upper half on 7/2/12 on the lower repeat 7/12/12. Completed IV antibiotics and wound healed 7/27/12.

Case Study 5



Patient with left hand and SP DRP right osteomyelitis 6/12 and developed infection. She was admitted to area on 7/2/12 Discharged 7/12/12 IV antibiotics for pseudomonas infection. The Hse prosthesis material applied there. NPWT and oral administration over the infection tendon area. She had prosthesis done 8/2/12. The heel prosthesis material on the heel that had to be removed and the heel area closed surgically 8/2/12. The culture showed growth of MRSA. Completed course of IV antibiotics for MRSA in home.

Ravi K. Kamepalli MD, CWI
Regional Infectious Diseases and Infusion Center, Inc.
830 West High St., Suite 255 - Lima, Ohio, USA, 45801
Office: 419-228-1535
Email: nobadbugs@gmail.com
Website: www.nobadbugs.com

Michael Hiles, PhD
Cook Biotech Incorporated
1425 Innovation Place
West Lafayette, IN 47906
1-888-229-4224

Sherwin V. Kevy, MD
Associate Professor Emeritus
Harvard Medical School
617-300-0191

May J Jacobson, PhD
Research Associate in Orthopedic Surgery
Children's Hospital, Boston
Harvard Medical School
617-300-0190

"PRP PREPARATION THROUGH HARVEST/TERUMO, PLYMOUTH MA" "SIS-SMALL INTESTINE SUBMUCOSA LAYER THROUGH COOK BIOTECH INCORPORATED"

Case Study 9



64 year old diabetic female with history of MRSA carrier. She presented to hospital with a large ulcer on her right foot. Underwent debridement surgery on 7/20/12 and the debridement was done with drainage and infection with osteomyelitis. Treated with antibiotics and PRP application and was started on IV antibiotics for 2 weeks. Had PRP + SIS done on 7/20/12. Depth of wound improved remarkably allowing for debridement 8/12/12. Culture removed and completely healed 8/12/12.

Case Study 10



64 year old diabetic male with history of MRSA carrier. He presented to hospital with a large ulcer on his right foot. Underwent debridement surgery on 7/16/12 and the debridement was done with drainage and infection with osteomyelitis. Treated with antibiotics and PRP application and was started on IV antibiotics for 2 weeks. Had PRP + SIS done on 7/16/12. Depth of wound improved remarkably allowing for debridement 8/10/12. Culture removed and completely healed 8/10/12.