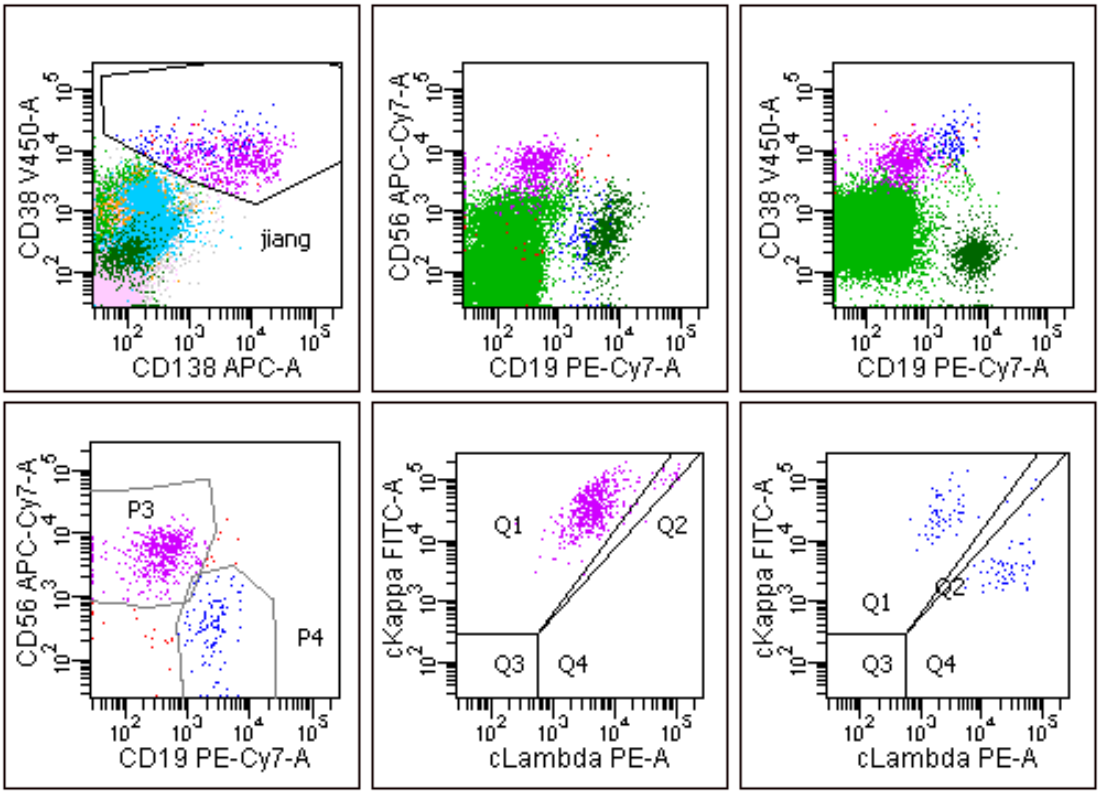
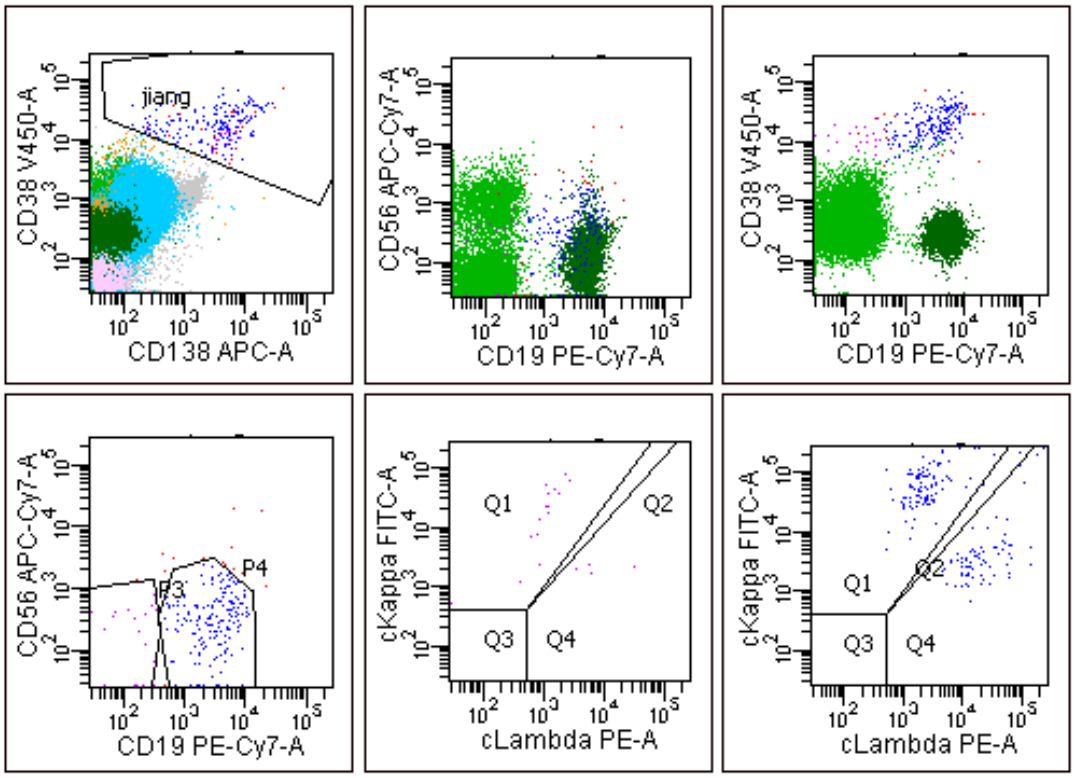
Supplemental Information

Supplementary Figure 1



Supplementary Figure 1. Flow cytometry analysis of nucleated cells from the bone marrow of Patient 1 before treatment. The cell populations in purple and blue indicate total plasma cells which are CD38+and CD138+. The cell population in purple accounts for 90.35% of the total plasma cells, which is monoclonal plasma cells expressing CD38+, CD138+, CD56, cKappa, but not CD19 and cLambda. The cell population in blue indicates normal plasma cells which is polyclonal plasma cells expressing CD19, cKappa, and cLambda, and accounts for 7.69% of the total plasma cells.

Supplementary Figure 2



Supplementary Figure 2. Flow cytometry analysis of nucleated cells from the bone marrow of Patient 1 after treatment with three cycles of VCD regimen. The cell populations in purple and blue indicate plasma cells which are polyclonal plasma cells expressing cKappa, and cLambda.

Supplementary Table 1. Summary of whole-genome sequencing metrics.

Sample	Normal	Tumor
Clean Reads	1,142,464,366	1,178,174,068
Clean Bases	171,369,654,900	176,726,110,200
Mapped Reads	1,139,349,807	1,171,364,524
Mapped Bases	168,804,446,562	173,466,417,314
Mapping Rate (%)	99.73	99.42
Mean Depth (fold)	59.48	61.12

Supplementary Table2. Summary of all somatic exonic SNVs.

Chromosome	Gene	Position (NCBI37)	Allele change	Amino acid change	Type	Function Prediction	
						SIFT	PolyPhen2
chr1	SZT2	43903104	A>G	p.N2015S	Missense	T	B
chr1	IGSF3	117146423	C>T	p.G483S，p.G503S	Missense	T	P
chr1	NBPF10	145304595	A>G	p.T510A	Missense	T	B
chr2	POTEE	132021629	G>T	p.E867D	Missense	T	B
chr2	NRP2	206641017	A>G	p.M830V, p.M825V	Missense	T	B
chr6	HIST1H2BM	27783184	G>C	p.K121N	Missense	.	B
chr9	AQP7	33395135	G>C	p.L29V	Missense	T	B
chr9	AQP7	33395136	T>C	p.I28M	Missense	T	B
chr9	TMEM245	111870745	G>C	p.L229V	Missense	T	D
chr11	PGA3	60971694	A>G	p.K58E	Missense	T	B
chr12	TAS2R43	11244243	T>G	p.M196L	Missense	T	B
chr14	SLC7A8	23612372	T>G	p.T79P, p.H11P, p.T184P	Missense	D	D
chr15	MCTP2	94841753	A>G	p.I87V, p.I87V	Missense	T	B
chr17	PLCD3	43192762	C>A	p.E503D	Missense	T	B
chr17	LRRC37A3	62892919	C>A	p.D153Y	Missense	D	D
chr18	CLUL1	645051	G>A	p.V451I, p.V503I	Missense	T	B
chr18	LOXHD1	44139463	C>T	p.G1055D	Missense	D	D
chr21	KRTAP10-4	45994110	A>G	p.I159V	Missense	T	B
chrX	ATG4A	107381102	G>T	p.A206S	Missense	T	B
chr1	OR2T2	248617028	T>C	p.G310G	synonymous	-	-
chr6	MDFI	41621109	G>A	p.L118L, p.L179L, p.L179L, p.L179L	synonymous	-	-
chr7	MUC12	100644692	A>G	p.T3616T	synonymous	-	-
chr14	RBM23	23371268	A>G	p.A355A	synonymous	-	-
chr22	IGLL5	23230314	G>A	p.L27L	synonymous	-	-
chr7	IQCA1L	150894944	T>A	unknown	unknown	-	-

Supplementary Table 3. Summary of somatic structural variants of deletion, duplication, and inversion.

Chromosome	Break 1 Location	Break 2 Location	Structural variant	cytoBand
Chr2	33141401	62435304	Deletion	2p22.3-p15
Chr7	72788842	72789445	Deletion	7q11.23
Chr13	113518013	113519239	Deletion	13q34
Chr2	3925437	33141405	Duplication	2p25.3-p22.3
Chr10	53984356	54034064	Duplication	10q21.1
Chr15	23103187	23104146	Duplication	15q11.2
Chr22	23686256	25070295	Duplication	22q11.23
Chr2	14091693	33141660	Inversion	2p24.3-p22.3
Chr2	33141401	126175986	Inversion	2p22.3-q14.3
Chr2	130886757	131967215	Inversion	2q21.1
Chr6	19429630	19430529	Inversion	6p22.3
Chr7	5943362	6861029	Inversion	7p22.1
Chr13	111736773	112875947	Inversion	13q34
Chr19	14508801	14876285	Inversion	19p13.12

Supplementary Table 4. Summary of somatic structural variants of translocation.

Chromosome	Break Location	Break Genes	Structural variant	cytoBand
chr2	33141638	LINC00486	t(2;3)	2p22.3
chr3	96623378	EPHA6		3q11.2
chr2	33141687	LINC00486	t(2;4)	2p22.3
chr4	18579684	LCORL,SLIT2		4p15.31
chr2	33141401	LINC00486	t(2;5)	2p22.3
chr5	32927139	NPR3,LOC340113		5p13.3
chr2	33141694	LINC00486	t(2;5)	2p22.3
chr5	99197896	CTD-2151A2.1, LOC100133050		5q21.1
chr2	33141403	LINC00486	t(2;6)	2p22.3
chr6	56643339	DST		6p12.1
chr2	33141404	LINC00486	t(2;6)	2p22.3
chr6	74872386	LOC101928516		6q13
chr2	33141639	LINC00486	t(2;6)	2p22.3
chr6	86801100	SNHG5,HTR1E		6q14.3
chr2	33141659	LINC00486	t(2;8)	2p22.3
chr8	23646300	NKX2-6,STC1		8p21.2
chr2	114259009	FOXD4L1	t(2;9)	2q13
chr9	115895	FOXD4		9p24.3
chr2	33141412	LINC00486	t(2;9)	2p22.3
chr9	30171321	LINGO2,LINC01242		9p21.1
chr2	33141661	LINC00486	t(2;10)	2p22.3
chr10	36583876	PCAT5,ANKRD30A		10p11.21
chr2	33141414	LINC00486	t(2;11)	2p22.3
chr11	26141043	LUZP2,ANO3		11p14.2
chr2	33141401	LINC00486	t(2;11)	2p22.3
chr11	105333708	CARD18,GRIA4		11q22.3
chr2	33141658	LINC00486	t(2;13)	2p22.3
chr13	49856044	CDADC1		13q14.2

Supplementary Table 4 (continued)

Chromosome	Break Location	Break Genes	Structural variant	cytoBand
chr2 chr13	33141639 62381521	LINC00486 PCDH20,LINC00358	t(2;13)	2p22.3 13q21.31
chr2 chr13	33141694 89486464	LINC00486 LINC00433,LINC01047	t(2;13)	2p22.3 13q31.2
chr2 chr15	33141408 29411569	LINC00486 FAM189A1	t(2;15)	2p22.3 15q13.1
chr2 chr19	33141297 9902597	LINC00486 ZNF846,FBXL12	t(2;19)	2p22.3 19p13.3
chr12 chr19	113257085 1520904	RPH3A ADAMTSL5,PLK5	t(`2;19)	12q24.13 19p13.2
chr2 chr20	33141401 12118230	LINC00486 BTBD3,LOC101929486	t(2;20)	2p22.3 20p12.1
chr2 chr20	33141297 31209110	LINC00486 LOC149950,C20orf203	t(2;20)	2p22.3 20q11.21
chr2 chrX	33141657 21433702	LINC00486 CNKSR2	t(2;X)	2p22.3 Xp22.12
chr2 chrX	33141401 69053823	LINC00486 EDA	t(2;X)	2p22.3 Xq13.1
chr2 chrX	33141464 85189454	LINC00486 CHM	t(2;X)	2p22.3 Xq21.2

Supplementary Table 5. Clinical information of patients with TEMPI syndrome.

Characteristic	Patient 1	Patient 2	Patient 3
Demographic			
Age	52	60	57
Sex	Female	Male	Male
Year of presentation	July 2017	January 2020	August 2020
TEMPI syndrome			
Telangiectasias, most prominent over the face, trunk, arms, and hands	Yes	Yes	Yes
Erythrocytosis	Yes	Yes	Yes
Hematocrit at presentation (%)	62%	52.3%	61.2%
Erythropoietin (mU/ml)	106	676.16	741
Monoclonal gammopathy	IgG-KAP (7.1g/L)	IgA-KAP (5.1g/L)	IgG-KAP (9.6g/L)
Plasma cells (%)	7%	3%	2.5%
Perinephric fluid	Yes	Yes	Yes
Requiring surgical marsupialization	No	No	No
Intrapulmonary shunting	Yes	Yes	Yes
Other			
Venous thrombosis	No	No	No
Spontaneous intracranial hemorrhage	No	No	No
Pleural and abdominal effusion	Left pleural effusion, abdominal effusion	Pleural, abdominal, and pelvic effusion	Right pleural effusion, abdominal, pelvic, and retroperitoneal effusion
β2- microglobulin	3.3mg/L	2.6mg/L	2.7mg/L
LDH	300U/L	237U/L	259U/L
BCR/ABL translocation and mutations of JAK2V617F, JAK2 exon 12, CALR, and MFL	Negative	Negative	Negative