Supplementary Table S1. Clinical features of the patients enrolled in the study.

PATIENTS	% BLASTS in BM	TIME FROM DIAGNOSIS TO ANALYSIS	WHO-2016	IPSS-R	IPSS-R RISK	CYTOGENETIC RISK	MUTATIONAL PROFILE	SCORE MUTATIONAL	MOLECULAR RISK	TREATMENT
1	3	1 month	MDS-SLD (Early Stage)	BR	Low Risk	Good (Favorable)	*ASXL1* (37%), *U2AF1* (41.8%), *SETBP1* (2.9%)	3	High Risk	Azacitidine
2	2	4 month	MDS-SLD (Early Stage)	VL	Low Risk	Good (Favorable)	*ASXL1* (44,2%), *U2AF1* (40,85%)	2	High Risk	NA
3	2	3 month	MDS-RS-SLD (Early Stage)	BR	Low Risk	Good (Favorable)	*SF3B1* (43,2%), *TET2* (47,2%)	2	Low Risk	NA
4	2	1 year	MDS-MLD (Early Stage)	INT	High Risk	Good (Favorable)	*TP 53* (28,6%), *ASXL1* (25,4%), *SRSF2* (28,6%), *U2AF1* (30,6%)	4	High Risk	Azacitidine
5	0	5 month	MDS-MLD (Early Stage)	VL	Low Risk	Good (Favorable)	*ASXL1* (18,3%), *EZH2* (37,3%), *RUNX1* (9,9%), *TET2* (28%)	4	High Risk	Azacitidine
6	1	<1 month	MDS-MLD (Early Stage)	INT	High Risk	Poor (Unfavorable)	*TP53* (76,4%)	1	High Risk	NA
7	3	1 year	MDS-MLD (Early Stage)	VL	Low Risk	Good (Favorable)	*IDH2* (46,6%), *DNMT3A* (45%)	2	Low Risk	NA
	1	1.5 years					*IDH2* (46.7%), *DNMT3A* (46.5%)	2	Low Risk	Azacitidine
8	2,5	1 year	MDS-MLD (Early Stage)	VL	Low Risk	Very Good (Favorable)	ND	ND	Low Risk	Supportive care
9	3	2 years	MDS-MLD (Early Stage)	VL	Low Risk	Good (Favorable)	Not detected	0	Low Risk	NA
10	2	5 month	MDS-MLD (Early Stage)	BR	Low Risk	Good (Favorable)	*ASXL1* (12,5%)	1	High Risk	Supportive care
11	3	2 year	MDS-RS-MLD (Early Stage)	BR	Low Risk	Good (Favorable)	ND	ND	Low Risk	Supportive care
12	4	2 years	MDS-RS-MLD (Early Stage)	VL	Low Risk	Good (Favorable)	*RUNX1* (49.3%), *SF3B1* (28%)	2	High Risk	NA

13	1	8 month	MDS *del*(5q) (Early Stage)	INT	High Risk	Good (Favorable)	Not detected	0	Low Risk	Supportive care
14	3	<1 month	MDS *del*(5q) (Early Stage)	BR	Low Risk	Good (Favorable)	**ASXL1** (47.7%), TET2 (47.3%)	2	High Risk	NA
15	2	1.5 month	MDS SA (Early Stage)	BR	Low Risk	Good (Favorable)	***RUNX1*** (18.8%), *SF3B1* (42%), *JAK2* (5.8%), *TET2* (40.9%)	4	High Risk	Supportive care
16	6	1.5 month	MDS EB-1 (Advanced Stage)	INT	High Risk	Poor (Unfavorable)	*SF3B1* (40,3%)	1	Low Risk	NA
17	6	1 year	MDS EB-1 (Advanced Stage)	AR	High Risk	Intermediate (Unfavorable)	***ASXL1*** (32.5%), *ZRSR2* (67.4%)	2	High Risk	Supportive care
18	9	<1 month	MDS EB-1 (Advanced Stage)	INT	High Risk	Good (Favorable)	***ASXL1*** (11,6%)	1	High Risk	Azacitidine
19	6	<1 month	MDS EB-1 (Advanced Stage)	INT	High Risk	Good (Favorable)	*WT1* (11.8%)	1	Low Risk	NA
	1	4 month					*WT1* (17.4%)	1	Low Risk	Azacitidine
20	5,5	<1 month	MDS EB-1 (Advanced Stage)	MAR	High Risk	Very Poor (Unfavorable)	***TP53*** (2.9%), ***RUNX1*** (1.9%)	2	High Risk	NA
21	18	<1 month	MDS EB-2 (Advanced Stage)	INT	High Risk	Good (Favorable)	***ASXL1*** (31.1%), *FLT3* (9.3%), *SRSF2* (32.8%), *TET2* (33.3%), *NRAS c.35G>A* (11.8%), *NRAS c34G>A* (5.9%), *ETV6* (2.5%)	7	High Risk	NA
	0	3 month					***ASXL1*** (18%), *FLT3* (1%), *SRSF2* (21.1%), *TET2* (42.7%), *NRAS c.35G>A* (3.9%), *NRAS c34G>A* (1.1%), *ETV6* (3.3%), *CEBPA* (2.7%), *JAK2* (16.4%), *CBL* (10%)	10	High Risk	Chemotherapy
22	12	2 years	MDS EB-2 (Advanced Stage)	MAR	High Risk	Intermediate (Unfavorable)	***ASXL1*** (45,9%), ***RUNX1*** (48%), ***EZH2*** (94,7%), *NRAS* (11,5%), *FLT3* (2%), *CEBPA* (1,7%)	6	High Risk	Azacitidine
23	18	<1 month	MDS EB-2 (Advanced Stage)	MAR	High Risk	Very Poor (Unfavorable)	***TP53*** (70.5%)	1	High Risk	NA

| 24 | 15 | <1 month | MDS EB-2 (Advanced Stage) | AR | High Risk | Good (Favorable) | *ASXL1* (41.6%), *RUNX1* (47.3%), *EZH2* (93.3%), *CSF3R* (45.1%), *CSF3R* (5.9%) | 5 | High Risk | NA |

Note: BM: Bone Marrow; Myelysplastic Syndrome (MDS); MDS with single lineage dysplasia: MDS-SLD; MDS with multilineage dysplasia: MDS-MLD; MDS with ring sideroblasts: MDS-RS; MDS with SLD and ring sideroblasts (MDS-RS-SLD); MDS with MLD and ring sideroblasts (MDS-RS-MLD); MDS with isolated del(5q): MDS (*del*5q); MDS EB-1, -2: MDS with Excess of Blasts-1, -2.

IPSS-R: Revised International Prognostic Scoring System. **Low Risk** (Very Low Risk (VLR)/Low Risk (LR); **High Risk** (Intermediate Risk (INT)/High Risk (HR)/Very High Risk (VHR).

Cytogenetic risk: Favorable [Very good (-Y, del(11q), Good (normal, del(20q), del(5q) alone or with 1 other anomaly and del(12p)]; Poor [Poor (complex with 3 abnormalities, der(3q) or chromosome 7 abnormalities), Very poor (complex with ≥3 abnormalities)]; Intermediate (all other single or double abnormalities not listed). **Favorable** (Good karyotypes) vs. **Unfavorable** (Intermediate, Poor and Very Poor karyotypes).

Mutational Score: number of total somatic mutations detected in each patient. In Mutational Profile, the Variant Allelic Frequencies (VAFs) are shown in parentheses and genes indicated in bold are High Molecular Risk (HMR) genes [5].

Molecular risk: High Risk (presence of at least one mutation in any of High Molecular Risk (HMR) genes) vs. **Low Risk** (absence of mutations in HMR genes).

NA: Not Applicable; ND: No Data.