In total, 1,064 CRCs were included in this evaluation, ultimately comparing left- and right-sided tumors (LT [n=246] and RT [n=56]) among AYA (≤ 40 years) with CRC.

**RESULTS**

- RT had statistically significant (p<0.05) higher mutation rates in various genes (as shown above) such as the following: **BRAF** (24.2% vs. 2.9%), **PIK3CA** (27% vs. 11.2%), **MT22D** (27.8% vs. 3.4%), **MSH6** (11.1% vs. 2.3%), **PTEN** (10.8% vs. 2.3%), **BRCA1** (5.4% vs. 0.6%), **MLH1** (10.5% vs. 2.3%) and **MSH2** (10.5% vs. 1.2%).
- **MSH-H** was observed in 25% of RT compared to 5.5% of LT.
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**SUMMARY AND CONCLUSIONS**

- Molecular portraits of right- and left-sided AYA colon cancer revealed significant differences in protein expression, gene amplification and mutation.
- Significantly higher molecular alteration rates of **BRAF, ERBB2, KRAS, PIK3CA**, and **PTEN** were found in right-sided AYA colon cancer. Left-sided AYA colon cancers were found to have higher rates of **APC and TP53**. Different treatment strategies may be warranted based on tumor sidedness.
- Right-sided AYA colon cancer had statistically significant higher rates of **TMB, POLE mutations**, and **MMRd (MLH1 and PMS2 loss)**, implying RT cancers may derive more benefit from immune checkpoint blockade therapy.
- Targeting alterations in histone modification may be more beneficial in AYA populations relative to older (≥65 year old) groups.
- Given the increasing rates of colon cancer in younger populations, further studies are urgently needed.

**REFERENCES**