5 Minute JournalClub

Key ASH Presentations
Issue 4, 2012

Survival Advantage of Ruxolitinib in Advanced Myelofibrosis

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CME INFORMATION

OVERVIEW OF ACTIVITY

The annual American Society of Hematology (ASH) meeting is unmatched in its importance with regard to advancements in hematologic cancer and related disorders. It is targeted by many members of the clinical research community as the optimal forum in which to unveil new clinical data. This creates an environment each year in which published results and new information lead to the emergence of many new therapeutic agents and changes in the indications for existing treatments across virtually all malignant and benign hematologic disorders. As online access to posters and plenary presentations is not currently available, a need exists for additional resources to distill the information presented at the ASH annual meeting for those clinicians unable to attend but desiring to remain up to date on the new data released there. To bridge the gap between research and patient care, this CME activity will deliver a serial review of the most important emerging data sets from the latest ASH meeting, including expert perspectives on how these new evidence-based concepts can be applied to routine clinical care. This activity will assist medical oncologists, hematologists and hematology-oncology fellows in the formulation of optimal clinical management strategies and the timely application of new research findings to best-practice patient care.

LEARNING OBJECTIVES

- Counsel patients with JAK2 mutation-positive and mutation-negative myelofibrosis about the benefits and risks of ruxolitinib treatment.
- Recall ongoing clinical trials with new agents for the treatment of myeloproliferative neoplasms, and consent or refer appropriate patients for participation.

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To go directly to slides and commentary for this issue, **click here**.

It's easy to criticize regulatory agencies, but it also seems that when stuff clearly works things can move along pretty quickly. This was the case following last June's spectacular ASCO presentations of 2 Phase III trials (COMFORT-I and II) demonstrating that the JAK1-2 inhibitor ruxolitinib had convincing and impressive activity in patients with myelofibrosis (MF). These landmark data led to FDA approval in November — immediately providing oncologists with both new hope and many additional questions about this unique disease.

I met with the principal investigator of the North American/Australian COMFORT-I trial, MD Anderson's Dr Srdan Verstovsek, to find out what happened at ASH to follow the ASCO explosion, but before diving into the data we talked about the human side of this profound saga. Dr Verstovsek recounted a number of very memorable real-life stories he has been part of in this new treatment era, including that of a 67-year-old Kansas man with JAK2 mutation-negative disease who had been down the "observation followed by hydroxyurea" route and then started to experience the misery this neoplasm can cause. In desperation 18 months ago he found his way to Houston, enrolled on a Phase I-II trial of ruxolitinib and almost immediately experienced shrinkage of his aching spleen (15 to 3 cm), increased mobility, weight gain and dramatic relief of constitutional symptoms. The patient recently sent Dr V a colorful postcard from a lifelong dream vacation with his wife in Costa Rica.

Dr Verstovsek reflected on what it's like to see people who thought they were doomed to indefinite misery feel good again, but he also cautioned that ruxolitinib "is a drug and not a magic pill." In that regard, it is clear that additional research is needed to bring about a profound sea change in this often relentless disease for which up until now we had no good answers. Below find Dr V's take on which MF happenings at ASH may help further shift the tide in coming years.

1. Ruxolitinib

Although only about half of patients with MF have JAK2V617F mutations, all have dysregulation of the JAK-STAT pathway and benefit from JAK inhibition. At ASH Dr Verstovsek presented an update of **COMFORT-I**, including a survival benefit (HR = 0.50 with 13 versus 24 deaths), data showing that major symptom palliation was observed across all patient subsets (IPSS risk, age, V617F mutation, spleen size and Hb level) and that these effects were quickly lost when the drug was discontinued (**click here for a dramatic graphic**).

In addition, the tandem ASH presentation of the **COMFORT-II** European study follow-up demonstrated nearly identical spleen shrinkage across disease subtypes. **Another data set** presented by Dr Verstovsek suggested an important survival benefit for patients on MD Anderson Phase I-II trials of ruxolitinib compared to historical controls.

2. Pure JAK2 inhibitors

A number of other JAK inhibitors are currently being studied, and new data on several were reported at ASH. The first, pacritinib, is an oral JAK2 but not JAK1 inhibitor, but the waterfall plot for spleen size reduction from the Phase II study presented was similar to what was seen with ruxolitinib. The main downside of this agent was manageable GI toxicity, but of particular note, no myelosuppression was observed. Consequently this molecule and others like it may be particularly useful in patients with thrombocytopenia and anemia. The other JAK2 inhibitor that made an impression at ASH was SAR302503, which demonstrated not only efficacy and safety but also reduction in circulating JAK2V617F allele burden.

3. Pegylated interferon alpha-2a in polycythemia vera

Interferon has long been known to have significant activity in this disease, but the side effects have been prohibitive. Long-term follow-up (6.4 years) from this Phase II study of weekly administration of the more tolerable pegylated formulation of this therapy demonstrated that 94% of patients were still in hematologic response and 29% were able to stop treatment without further cytoreductive therapy. Dr Verstovsek notes that the elimination of clones with the JAK2 mutation as seen in this study does not occur with JAK inhibitors.

4. Panobinostat; pomalidomide

Dr V becomes visibly animated when he talks about future trials combining JAK inhibition with other novel strategies, and at ASH we saw more data on some potential partners, including the HDAC inhibitor panobinostat, which showed modest activity. However, what really tickles Dr V's fancy is the idea of combining JAK inhibitors with the IMiD pomalidomide, an agent that at ASH was again demonstrated to frequently alleviate anemia, a benefit usually not seen with JAK inhibitors.

Next we reconsider lung cancer and the most common patient subset in this ubiquitous disease: Patients with EGFR and ALK wild-type metastatic adenocarcinoma.

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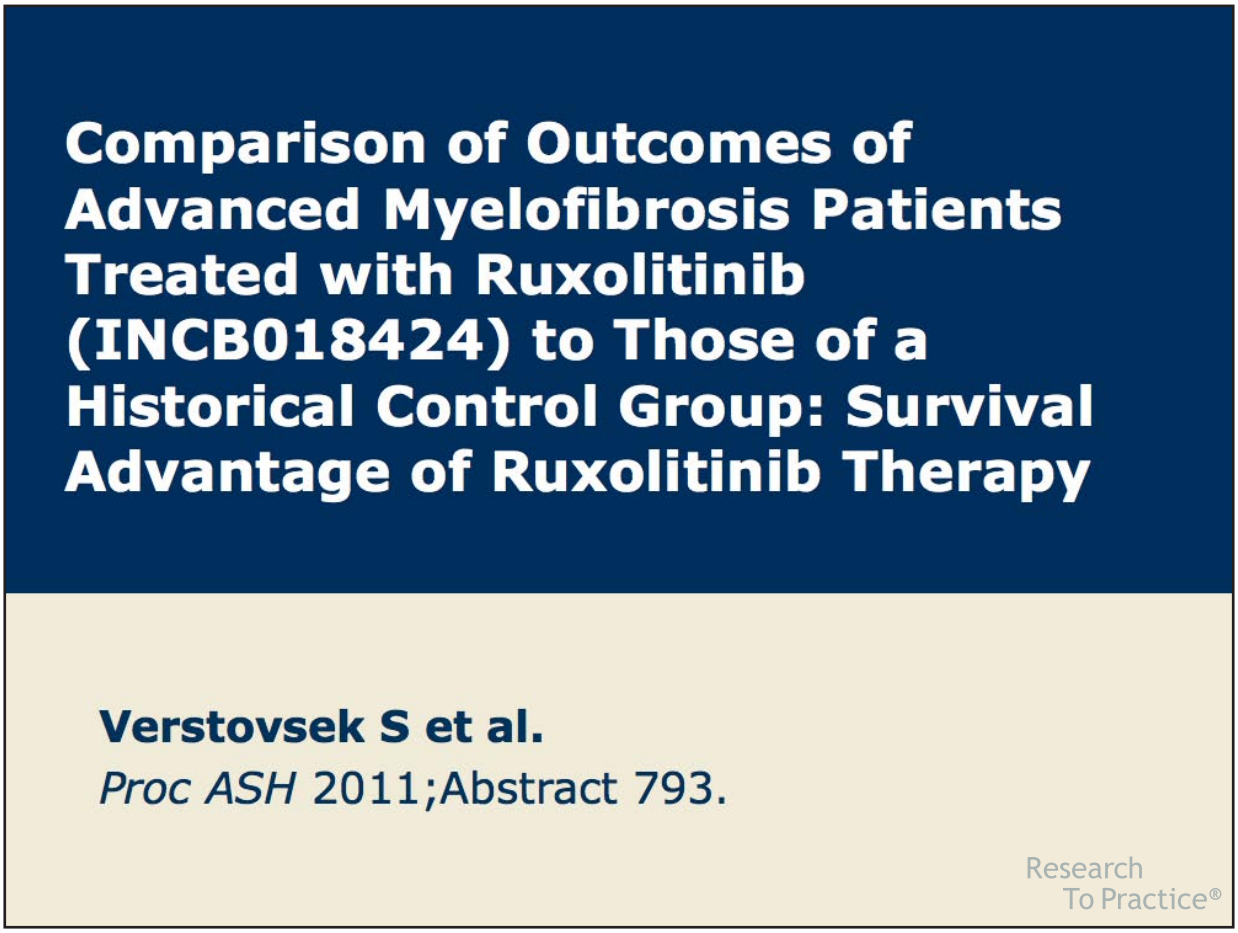
Survival Advantage of Ruxolitinib in Advanced Myelofibrosis

Presentation discussed in this issue

Verstovsek S et al. **Comparison of outcomes of advanced myelofibrosis patients treated with ruxolitinib (INCB018424) to those of a historical control group: Survival advantage of ruxolitinib therapy.** *Proc ASH* 2011;**Abstract 793**.

Slides from a presentation at ASH 2011 and transcribed comments from a recent interview with Srdan Verstovsek, MD, PhD (1/25/12)



Background

- Myelofibrosis (MF) is a myeloproliferative neoplasm associated with splenomegaly, cytopenias and fibrosis of the bone marrow.
- Ruxolitinib is a JAK1/2 inhibitor with established clinical benefit in the treatment of MF by improving spleen size and quality of life (*NEJM* 2010;363(12):1117).
- Patients with high-risk MF, in particular, demonstrate poor outcomes with a median survival of 2 years (*Am J Hematol* 2011;86(12):1017).
- **Objectives**:
  - Compare survival outcomes of patients with MF receiving ruxolitinib to those of a matched historical control group.
  - Determine the long-term durability of reductions in spleen size and improvements in symptoms with ruxolitinib.

Verstovsek S et al. *Proc ASH* 2011;Abstract 793.

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Patient Characteristics

MDACC Phase I/II study cohort (n = 107)	Historical control cohort (n = 310)
PMF or PPV-MF or PET-MF Newly diagnosed with intermediate- to high-risk MF Required therapy including those refractory or intolerant to prior therapy ECOG PS ≤2	Identified from 3 large databases of patients with MF – MD Anderson Cancer Center (MDACC) – University of Pavia, Italy – Hospital Niguarda ca' Granda, Milan, Italy Matched to MDACC cohort based on eligibility criteria of the Phase I/II trial that evaluated the efficacy and safety of ruxolitinib (*NEJM* 2010;363(12):1117).

Verstovsek S et al. *Proc ASH* 2011;Abstract 793.

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Baseline Demographics

	MDACC cohort (n = 107)	Historical cohort (n = 310)
Treatment	**Ruxolitinib**	**Conventional or investigational therapies**
IPSS risk category High Intermediate-2 Intermediate-1	 59% 32% 9%	 53% 47% 0%
Median palpable spleen length	19 cm	6 cm
Median platelet count	277 x 10^9/L	265 x 10^9/L

Verstovsek S et al. *Proc ASH* 2011;Abstract 793.

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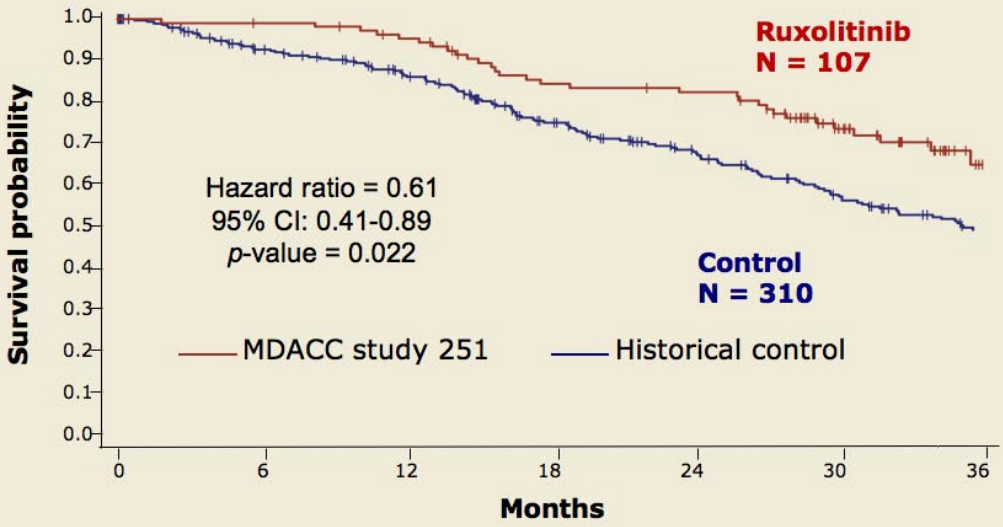
Overall Survival (OS): MDACC Study Cohort vs Historical Cohort



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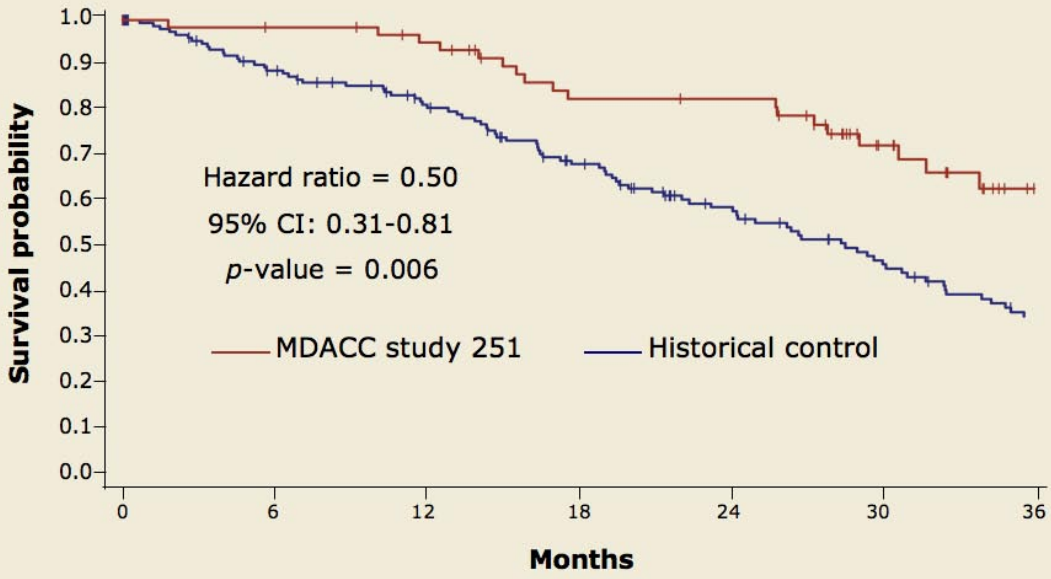
OS: MDACC vs Historical Category (High-Risk Category)



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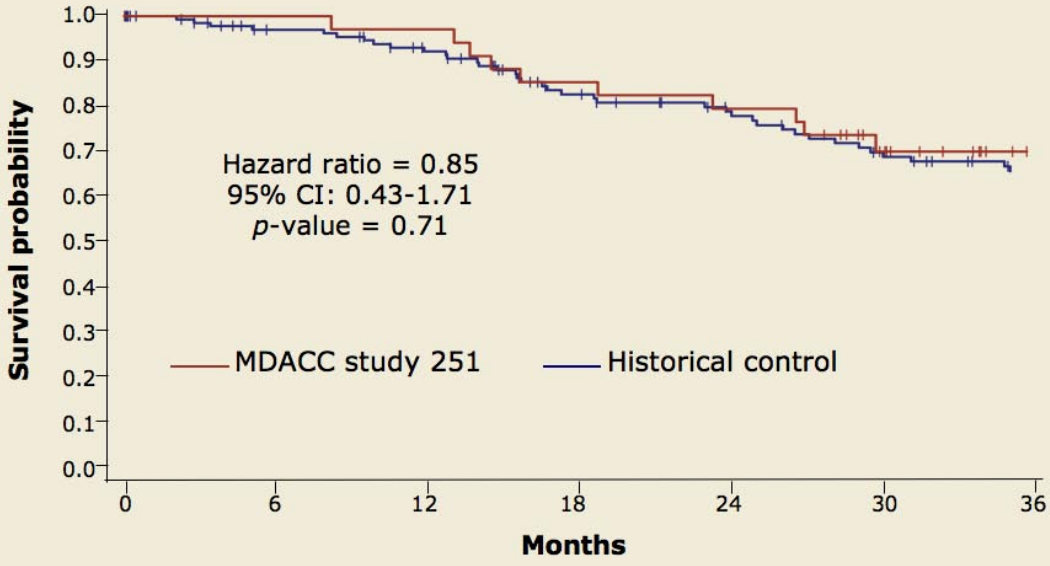
OS: MDACC vs Historical (Intermediate-2 Risk Category)



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Author Conclusions

- Ruxolitinib demonstrated durable reductions in spleen size and myelofibrosis symptoms in the MDACC cohort.
- Fewer deaths in the MDACC ruxolitinib-treated patient cohort were observed than in the historical group of patients.
- After a median follow-up period of 32 months, ruxolitinib was well tolerated in the MDACC cohort.
- The overall survival analysis demonstrated clinical benefits with ruxolitinib treatment over the matched historical control cohort ($p = 0.022$).

Verstovsek S et al. *Proc ASH* 2011;Abstract 793.

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Investigator Commentary: Outcomes among Patients with Advanced Myelofibrosis Treated with Ruxolitinib versus Historical Control

The clinical benefits of ruxolitinib in MF are durable because it inhibits JAK1/JAK2, the underlying abnormality of the disease. All patients with MF have dysregulated JAK-STAT pathways for one reason or another, whereas half of the patients exhibit a mutation in the JAK2 tyrosine kinase enzyme. Many of these patients with genetic mutations/abnormalities in the JAK-STAT pathway have multiple mutations, which led to an underlying dysfunction in signaling. Therefore, ruxolitinib is beneficial in controlling the signs and symptoms of MF in patients with or without JAK2 mutations and regardless of the characteristics of the patient subgroup.

Interview with Srdan Verstovsek, MD, PhD, January 25, 2012