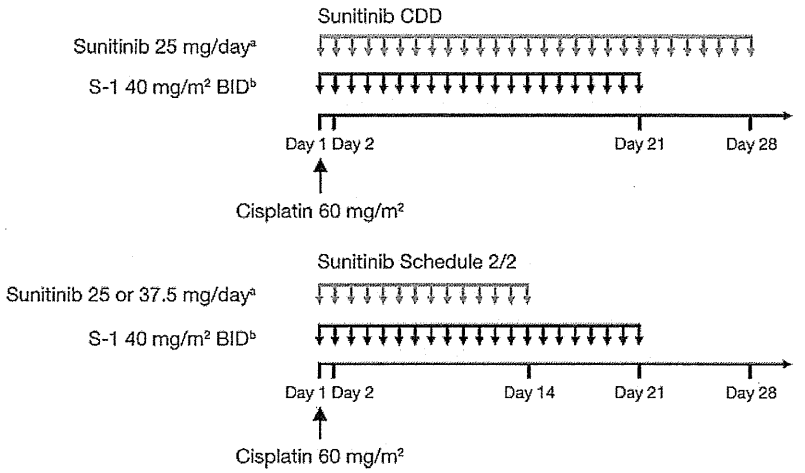

Fig. 1 Treatment schema. [a]Sunitinib dose withheld on cycle 1 day 1 to enable pharmacokinetic analysis of S-1 and cisplatin. [b]S-1 and cisplatin dose withheld on cycle 1 day 1 to enable pharmacokinetic analysis of sunitinib. *BID* twice daily; *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment

then patients would be enrolled at the next highest dose level.

The MTD was defined as the highest dose cohort where 0/3 or ≤1/6 patients experienced a DLT, with the next highest dose having at least 2/3 or 2/6 patients who experienced a DLT. DLTs are defined in Table 1. In this study, the MTD level was confirmed by expanding enrollment to include up to 10 additional patients with advanced/metastatic disease in order to obtain additional safety data for the combination treatment. It was anticipated that a total of approximately 30 patients would be enrolled in this study.

Dose modifications of sunitinib were not allowed until a DLT was reached. Once dose reduction occurred due to study drug-related toxicity, the dose was not re-escalated. Patients could undergo a maximum of two dose reductions of either S-1 and/or cisplatin. However, patients requiring more than two dose reductions of S-1 or sunitinib were withdrawn from the study. Additionally, patients with >1 missed cisplatin dose were withdrawn. Treatment was continued for 8 cycles or until disease progression, unacceptable toxicity, or withdrawal of patient consent.

The primary endpoint was the assessment of first-cycle DLTs for sunitinib plus S-1 and cisplatin. Secondary endpoints included overall safety, tumor response, PFS, and PK.

Assessments

Patients were evaluable for DLT assessment if they received all day 1 chemotherapy and ≥80 % of their sunitinib doses and S-1 doses. Those who could not receive ≥80 % of their doses for reasons other than a DLT were excluded from the DLT evaluation. Tumor assessment was performed at baseline, on day 22 of cycle 1, and every 4 weeks thereafter until radiographic-confirmed disease progression or end of treatment scan. Objective tumor response in patients with at least one target lesion was measured using the Response Evaluation Criteria in Solid Tumors (RECIST) guidelines [22]

Table 1 Definition of DLT

Category	DLT criteria
Hematologic	Grade 4 neutropenia lasting ≥7 days
	Grade ≥3 febrile neutropenia
	Grade ≥3 neutropenic infection
	Grade 4 thrombocytopenia or grade 3 thrombocytopenia with bleeding
Non-hematologic[a]	Grade 3 toxicities lasting ≥7 days
	Grade 4 non-hematologic toxicity
	Grade 3/4 nausea, vomiting or diarrhea persisting despite maximum supportive therapy
Missed/delayed dose due to toxicity	Break from sunitinib dose ≥6/28 days on the CDD schedule or ≥3/14 days on Schedule 2/2
	Break from S-1 dose ≥5/21 days per cycle
	Delay of >3 weeks in starting the second treatment cycle

CDD continuous daily dosing; *DLT* dose-limiting toxicity; *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment

[a]Exceptions: hyperamylasemia or hyperlipasemia without other clinical evidence of pancreatitis and asymptomatic hyperuricemia; asymptomatic hypertension with adequately controlled blood pressure

and confirmed no sooner than 4 weeks after the initial documentation of response.

Safety was assessed at regular intervals (during cycle 1 on days 1, 2, 8, 15, and 22; during cycles 2–8 on days 1, 2, and 21; and during cycles ≥9 on days 1 and 21). AEs were monitored during the study and graded using the National Cancer Institute Common Terminology for Adverse Events version 3.0 clinical assessments, including laboratory testing for blood hematology and serum chemistry.

To investigate PK drug–drug interactions, full PK profiles of sunitinib, its active metabolite SU12662, S-1 (5-FU, tegafur) and cisplatin (total and free) were assessed in all cohorts comprising the 3+3 design, and in the MTD expansion cohort. Blood samples for analyses of cisplatin and S-1 were collected on cycle 1 days 1–2 (S-1 and cisplatin), before starting sunitinib dosing on day 2, and on cycle 2 days 1–2 (in combination with sunitinib) in the MTD cohort. In the expansion cohort, blood samples for the analyses of sunitinib and SU12662 were collected on cycle 1 days 1–2 (sunitinib alone), prior to administration of S-1 and cisplatin on day 2, and cycle 2 days 1–2 (in combination with S-1 and cisplatin). PK parameters were calculated using non-compartmental methods.

Trough plasma concentrations of sunitinib and SU12662 were obtained at steady state on cycles 1–3 days 21–22 for the CDD schedule, and cycles 1–3 days 14–15 for Schedule 2/2. Blood samples were obtained before the administration of sunitinib and S-1.

On the day of cisplatin PK sampling, blood was drawn pre-dose (before administration of cisplatin, S-1 or sunitinib) and at 0.5, 1, 2, 8, and 22 h after completing infusion. Samples for evaluation of sunitinib, SU12662, and S-1 PK were obtained pre-dose (before administration of either S-1 or sunitinib) and at 1, 2, 4, 6, 8, and 10 h post-dose (before dosing of S-1). For sunitinib and SU12662, a sample was also obtained 24 h post-dose.

Plasma samples were analyzed for sunitinib and SU12662 concentrations by Bioanalytical Systems Inc. (USA) using a validated high-performance liquid chromatography tandem mass spectrometric (HPLC-MS/MS) method. Tegafur and 5-FU plasma concentrations were also determined using a validated HPLC-MS/MS method by Tandem Labs (USA). Cisplatin concentrations were determined in both plasma and plasma ultra filtrate samples by Covance Laboratories Inc. (USA) using a validated Inductively Coupled Plasma–Mass Spectrometric (ICP/MS) method.

Statistical analysis

The sample size was determined on an empirical rather than statistical basis. Assessment of 3–6 patients for each cohort was considered adequate to characterize the safety of a treatment regimen prior to investigation in phase II clinical trials. It was anticipated that up to 30 patients would be enrolled in this study.

Efficacy analyses included all patients who received at least one protocol-specified dose of sunitinib. Descriptive statistics were used to summarize all patient characteristics, treatment administration/compliance, antitumor activity, and safety; PFS was summarized using the Kaplan–Meier method. In an unplanned exploratory analysis, clinical benefit rate (CBR; percentage of patients with a complete response, partial response, and stable disease ≥24 weeks) and PFS were calculated in patients with scirrhous-type disease of primary tumors.

Results

Patient characteristics

In total, 27 patients received treatment, including 26 patients treated per protocol (sunitinib 25 mg/day on the CDD schedule, 4; sunitinib 25 mg/day on Schedule 2/2, 16 [DLT cohort, 6 plus expansion cohort, 10]; sunitinib 37.5 mg/day on Schedule 2/2, 6), and one patient who was assigned to sunitinib 25 mg/day on Schedule 2/2 and erroneously self-administered sunitinib 12.5 mg/day throughout the study. The latter patient was excluded from the efficacy analyses. One patient remained on study as of April 2012. Demographic and baseline disease characteristics are shown in Table 2. Overall, eight patients had scirrhous-type disease (seven patients in the MTD cohort).

Safety and drug exposure

Twenty-seven patients were evaluable for safety. The MTD was determined to be sunitinib 25 mg/day on Schedule 2/2 plus cisplatin and S-1, and a further 10 patients were allocated to this cohort. Of the four patients who received sunitinib 25 mg/day on the CDD schedule, two DLTs were reported: grade 4 thrombocytopenia (n=1), and grade 4 thrombocytopenia plus grade 3 febrile neutropenia (n=1). Subsequently, the treatment frequency was reduced to sunitinib 25 mg/day on Schedule 2/2. In the second cohort, one of six patients reported a DLT: grade 3 neutropenic infection plus grade 4 thrombocytopenia and S-1 dose interruption of ≥5 days. As defined in the protocol, the sunitinib dose was then increased to 37.5 mg/day on Schedule 2/2, where three of six patients experienced a DLT: grade 3 febrile neutropenia plus S-1 dose interruption of ≥5 days (n=1), grade 4 thrombocytopenia (n=1), and grade 4 neutropenia of ≥7 days (n=1).

All patients experienced at least one AE. No grade 5 AEs occurred. Serious AEs (SAEs) were reported in 13

Table 2 Baseline patient characteristics

	CDD schedule sunitinib 25 mg/day	Schedule 2/2 sunitinib 25 mg/day		Schedule 2/2 sunitinib 37.5 mg/day
	All patients (n=4)[a]	All patients (n=16)[b,c]	Patients with scirrhous-type disease (n=7)	All patients (n=6)[d]
Gender, male, n (%)	2 (50.0)	13 (81.3)	6 (85.7)	4 (66.7)
Age, years				
Median	63.0	60.0	57.0	60.5
Range	44–73	31–71	31–67	28–71
ECOG performance status, n (%)				
0	1 (25.0)	7 (43.8)	2 (28.6)	3 (50.0)
1	3 (75.0)	9 (56.3)	5 (71.4)	3 (50.0)
Measurable disease, n (%)	3 (75.0)	11 (68.8)	5 (71.4)	4 (66.7)
Histology, n (%)				
Diffuse	2 (50.0)	9 (56.2)	6 (85.7)	2 (33.3)
Intestinal	2 (50.0)	7 (43.8)	1 (14.3)	3 (50.0)
Other	0 (0)	0 (0)	0 (0)	1[e] (16.7)
Prior surgery, n (%)	1 (25.0)	5 (31.3)	1 (14.3)	2 (33.3)
Prior systemic therapy, n (%)				
0	2 (50.0)	16 (100.0)	7 (100.0)	5 (83.3)
1	2 (50.0)	0 (0)	0 (0)	1 (16.7)
≥2	0 (0)	0 (0)	0 (0)	0 (0)

CDD continuous daily dosing; *ECOG* Eastern Cooperative Oncology Group; *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment

[a] Includes one patient with scirrhous-type disease

[b] Includes 10 patients from the expansion cohort

[c] The subject assigned to sunitinib 25 mg/day on Schedule 2/2 who mistakenly received sunitinib 12.5 mg/day was excluded from the efficacy analyses. At baseline, this patient had an ECOG performance status of 0, stage IV measurable intestinal disease, with 2 involved tumor sites (liver and lymph node) and no prior surgery or systemic therapy

[d] No patients had scirrhous-type disease in this cohort

[e] This patient had mucinous histology

patients overall (48.1 %). Dose reductions due to AEs occurred for all three drugs: sunitinib: n=8; S-1: n=7; cisplatin: n=8. At the MTD, the median relative dose intensity (% actual/intended dose intensity) was 80.6 % (range, 32.4–100.0) for sunitinib (25 mg/day, Schedule 2/2), 68.2 % (35.7–85.7) for S-1, and 73.8 % (27.1–98.9) for cisplatin. Overall, seven patients discontinued the study treatment due to AEs, including four patients in the MTD cohort.

In the MTD cohort (sunitinib 25 mg/day, Schedule 2/2; n=16), the frequencies of common AEs of any grade are presented in Table 3. Neutropenia was the most frequently reported grade 3 or 4 AE, occurring in 15 patients (93.8 %). In total, 75.0 % of patients in the MTD cohort experienced grade 3 or 4 leukopenia. Fatigue, decreased appetite, nausea, constipation, thrombocytopenia, and stomatitis were the most common grade 1 or 2 AEs reported. In this cohort, SAEs occurred in eight patients (50.0 %); the most frequent SAEs were febrile neutropenia (n=3, 18.8 %) and platelet count decreased (n=2, 12.5 %).

Pharmacokinetics

The MTD combination of sunitinib (25 mg/day, Schedule 2/2) with S-1 plus cisplatin demonstrated no changes in the PK of sunitinib or its active metabolite (SU12662). In addition, combination treatment had no impact on the PK of cisplatin, tegafur, 5-FU, or S-1, compared with S-1 plus cisplatin alone (Table 4).

The mean trough plasma concentrations (C_{trough}) of sunitinib, SU12662, and total drug were 33.5 ng/mL, 13.9 ng/mL, and 47.5 ng/mL, respectively, for sunitinib 25 mg/day, and 69.9 ng/mL, 24.0 ng/mL, and 93.4 ng/mL, respectively, for sunitinib 37.5 mg/day. These C_{trough} values suggested that plasma concentrations of sunitinib increased in a dose-dependent manner.

Antitumor activity

All patients were evaluable for efficacy. In the MTD group (sunitinib 25 mg/day, Schedule 2/2), 11/16 patients had

Table 3 Treatment-emergent (all-causality) adverse events in ≥30 % of patients in the maximum tolerated dose cohort (sunitinib 25 mg/day on Schedule 2/2+cisplatin+S-1; n=16)

Adverse event, n (%)	Grade 1/2	Grade 3/4	All grades
Leukopenia	4 (25.0)	12 (75.0)	16 (100.0)
Neutropenia	1 (6.3)	15 (93.8)	16 (100.0)
Anemia	6 (37.5)	9 (56.3)	15 (93.8)
Decreased appetite	14 (87.5)	1 (6.3)	15 (93.8)
Thrombocytopenia	9 (56.3)	6 (37.5)	15 (93.8)
Fatigue	14 (87.5)	0	14 (87.5)
Nausea	14 (87.5)	0	14 (87.5)
Constipation	12 (75.0)	0	12 (75.0)
Stomatitis	9 (56.3)	0	9 (56.3)
Diarrhea	7 (43.8)	1 (6.3)	8 (50.0)
Dysgeusia	7 (43.8)	0	7 (43.8)
Pyrexia	7 (43.8)	0	7 (43.8)
Hiccups	6 (37.5)	0	6 (37.5)
Rash	5 (31.3)	0	5 (31.3)
Vomiting	5 (31.3)	0	5 (31.3)

Schedule 2/2 2 weeks on treatment followed by 2 weeks off treatment

measurable disease. No patients had a complete response, and partial responses occurred in 6/11 patients (54.5 %) with measurable disease, resulting in an overall objective response rate (ORR) of 37.5 % (95 % confidence interval [CI], 15.2–64.6) in 16 evaluable patients. A further six patients experienced no disease progression for ≥24 weeks, producing a CBR of 75.0 % (95 % CI, 47.6–92.7) among the 16 patients. Maximum percentage reduction in target lesion size in the 11 patients with measurable disease is shown in Fig. 2. The CBR for patients treated at the MTD with scirrhous-type disease was 57.1 % (95 % CI, 18.4–90.1; 4/7 patients). Tumor response in one patient with scirrhous-type disease is shown in Fig. 3. At the MTD, median PFS was 12.5 months (95 % CI, 6.4–16.5) and 6-month survival was 78.3 % (95 % CI, 56.5–100.0; Table 5; Fig. 4). Among the seven patients with scirrhous-type disease, four of five patients who had measurable lesion had a partial response, and median PFS was 12.5 months (95 % CI, 10.1–13.3).

Discussion

In this study, the MTD of sunitinib in combination with S-1 (80–120 mg) plus cisplatin 60 mg/m^2 was established as 25 mg/day on Schedule 2/2 in patients with advanced or metastatic gastric cancer for whom curative therapy was not an option. Other tested combinations included sunitinib 25 mg/day on a CDD schedule and a dose-increment from the MTD cohort to 37.5 mg; both cohorts were discontinued after DLTs were experienced. An additional 10 patients were then enrolled in the MTD cohort and followed for safety, antitumor activity, and PK parameters.

The MTD combination regimen demonstrated a manageable safety profile, with neutropenia and leukopenia as the most frequently reported grade 3 or 4 AEs: 93.8 % and 75.0 %, respectively. This safety profile was also consistent with a similar phase I dose-escalation study conducted in Western patients with advanced gastric cancer [23]. In general, the type of AEs was consistent with those previously reported when 5-FU and cisplatin were administered in patients with gastric cancer [24], although the frequency of events, particularly hematologic AEs, was greater than expected from previous studies of sunitinib in other tumor types [18, 25–28]. Previously reported mild skin reactions associated with sunitinib, such as yellowing skin/discoloration [29], were not observed in this study. There were no grade 3 or 4 non-

Table 4 Pharmacokinetics in the maximum tolerated dose cohort (sunitinib 25 mg/day on Schedule 2/2+cisplatin+S-1)

Treatment	Analyte	n	Mean C_{max} ng/mL (CV%)		Mean AUC_{last} ng·h/mL (CV%)	
			Sunitinib alone or SP	Combined	Sunitinib alone or SP	Combined
Sunitinib	Sunitinib	7	15.8 (32.2)	16.2 (44.6)	234 (25.3)	244 (38.6)
	SU12662	7	2.9 (43.6)	2.8 (49.3)	46.0 (34.2)	50.5 (50.7)
	Total drug	7	18.5 (33.0)	19.0 (42.3)	280 (25.0)	294 (37.2)
S-1	Tegafur	5	1,500 (9.8)	1,688 (26.9)	8,290 (10.5)	9,163 (12.7)
	5-FU	5	144 (23.5)	114 (16.5)	582 (19.3)	522 (28.0)
Cisplatin	Total	5	1,794 (7.8)	1,984 (3.6)	27,478 (7.1)	31,574 (5.4)
	Free	5	178 (68.3)	187 (74.6)	790 (25.8)	973 (28.3)

AUC_{last} area under the plasma concentration–time curve from time zero until last quantifiable observation; *C_{max}* maximum concentration; *CV* coefficient of variation; *5-FU* 5-fluorouracil; *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment; *SP* cisplatin 60 mg/m^2 every 28 days+S-1 40 mg/m^2 twice daily every 3/1 weeks; *SU12662* sunitinib active metabolite

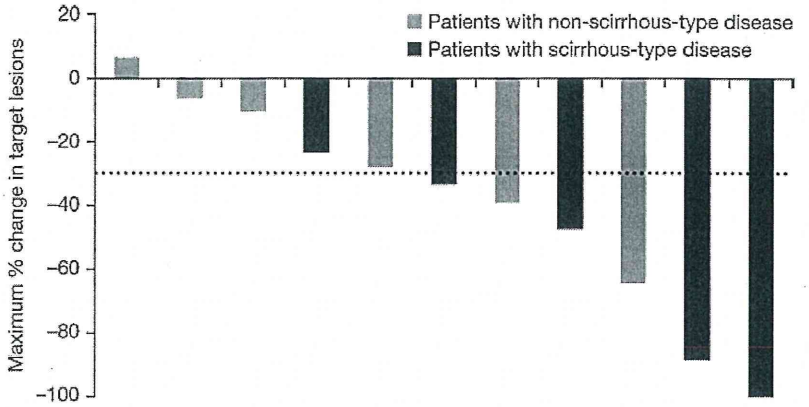

Fig. 2 Maximum percentage change in target lesion size in the maximum tolerated dose (MTD) cohort (sunitinib 25 mg/day on Schedule 2/2+cisplatin+S-1).[a] *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment. [a]Five of 16 patients receiving the MTD did not have measurable disease

hematologic events reported in ≥30 % of patients within the MTD cohort. No new safety signals were observed for sunitinib.

Although tumor evaluation was not the primary objective of this study, the ORR for the MTD cohort was 37.5 % (95 % CI, 15.2–64.6) and included responses in patients with scirrhous-type disease. Since five of 16 patients treated at the MTD did not have measurable disease and were assessed as non-responders in the ORR calculation, tumor response rates may be underestimated in our study. The ORR at the MTD among the 11 patients with measurable disease was 54.5 %. Median PFS was 12.5 months (95 % CI, 6.4–16.5) in the overall MTD cohort. These results demonstrate promising preliminary antitumor activity, compared with that observed for sunitinib as a single-agent modality in advanced gastric cancer, [18] and with the median PFS of 6 months reported for S-1 plus cisplatin [30]. However, our results must be interpreted with caution given the limited sample size studied.

A multitargeted tyrosine kinase inhibitor like sunitinib may be a promising drug for scirrhous gastric cancer. Our preliminary results suggest that sunitinib in combination

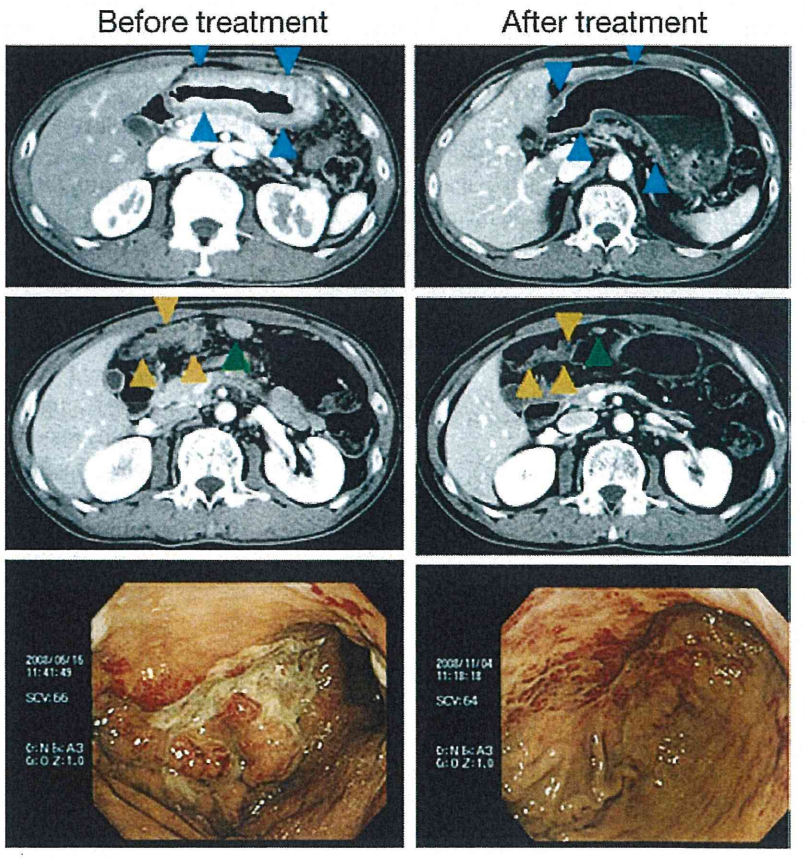

Fig. 3 Tumor response in a patient with scirrhous gastric cancer who received the maximum tolerated dose of sunitinib (25 mg/day on Schedule 2/2) combined with cisplatin and S-1. Blue arrowheads: primary lesion; orange arrowheads: peritoneal metastasis; green arrowheads: lymph node metastasis; *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment

Table 5 Summary of progression-free survival

	CDD schedule	Schedule 2/2	
	Sunitinib 25 mg/day (n=4)	Sunitinib 25 mg/day (n=16)[a]	Sunitinib 37.5 mg/day (n=6)
Patients with events, n (%)	2 (50.0)	9 (56.3)	4 (66.7)
Progression-free survival, months[b]			
Median	7.1	12.5	5.8
95 % CI	6.7–7.5	6.4–16.5	4.4–7.9
Probability of being event-free at month 6[c]			
Percentage	100.0	78.3	50.0
95 % CI[d]	100.0–100.0	56.5–100.0	1.0–99.0
Exploratory analysis: scirrhous-type disease			
		Schedule 2/2	
		Sunitinib 25 mg/day (n=7)[a]	
Patients with events, n (%)		4 (57.1)	
Progression-free survival, months[b]			
Median		12.5	
95 % CI		10.1–13.3	

CDD continuous daily dosing; *CI* confidence interval; *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment

[a] Maximum tolerated dose

[b] Based on the Brookmeyer and Crowley Method

[c] Estimated from the Kaplan–Meier curve

[d] Calculated from the product-limit method

with S-1 and cisplatin might have antitumor activity in patients with this disease type. However, as only seven of 16 patients at the MTD had scirrhous-type disease, caution should be used when interpreting these results. Despite this caveat, these data are encouraging, as scirrhous gastric cancer carries a worse prognosis than the non-scirrhous-type [31, 32], as it is characterized by rapid cancer cell infiltration and proliferation accompanied by extensive stromal fibrosis [32]. The proliferative and invasive ability of scirrhous gastric cancer cells have been shown to be closely associated with the growth factors produced by organ-specific fibroblasts and other stromal cells [32]. Therefore, targeting this cancer–stroma interaction using a multitargeted tyrosine kinase inhibitor such as sunitinib could be a reasonable treatment option for patients with scirrhous gastric cancer. However, large randomized studies would be required to confirm this hypothesis.

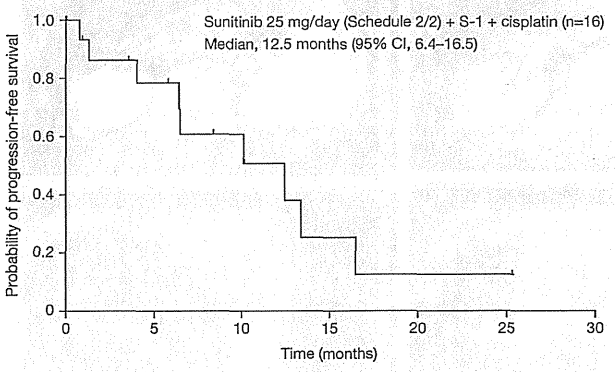

Fig. 4 Kaplan-Meier estimate of progression-free survival in the maximum tolerated dose cohort (sunitinib 25 mg/day on Schedule 2/2+ cisplatin+S-1). *CI* confidence interval; *Schedule 2/2* 2 weeks on treatment followed by 2 weeks off treatment

The combination of sunitinib with cisplatin plus S-1 demonstrated no PK drug–drug interactions, consistent with the different pathways of metabolism and elimination for these drugs. These findings are consistent with those from the phase I study with cisplatin plus 5-FU in Western patients [23]. The mean observed C_{trough} plasma concentration of 47.5 ng/mL, for total drug (sunitinib plus SU12662) at steady-state with sunitinib 25 mg/day dosing, in the present study suggests that optimal sunitinib exposure was almost achieved, in terms of the required concentration for target inhibition of ≥50 ng/mL [16].

In summary, the MTD of sunitinib was 25 mg/day on Schedule 2/2 in combination with cisplatin and S-1 when administered as a first-line therapy in patients with advanced or metastatic gastric cancer. This combination had a manageable safety profile and showed preliminary evidence of antitumor activity.

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Quantity of supporting information None

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DAISUKE TAKAHARI,[a] NARIKAZU BOKU,[b] JUNKI MIZUSAWA,[c] ATSUO TAKASHIMA,[c] YASUHIDE YAMADA,[d] TAKAYUKI YOSHINO,[e] KENTARO YAMAZAKI,[f] WASABURO KOIZUMI,[g] KAZUTOSHI FUKASE,[h] KENSEI YAMAGUCHI,[i] MASAHIRO GOTO,[j] TOMOHIRO NISHINA,[k] TAKAO TAMURA,[l] AKIHITO TSUJI,[m] ATSUSHI OHTSU[e]

[a]Department of Clinical Oncology, Aichi Cancer Center Hospital, Nagoya, Japan; [b]Department of Clinical Oncology, St. Marianna University School of Medicine, Kanagawa, Japan; [c]JCOG Data Center, Multi-institutional Clinical Trial Support Center, National Cancer Center, Tokyo, Japan; [d]Gastrointestinal Oncology Division, National Cancer Center Hospital, Tokyo, Japan; [e]Department of Gastroenterology and Gastrointestinal Oncology, National Cancer Center Hospital East, Kashiwa, Japan; [f]Division of Gastrointestinal Oncology, Shizuoka Cancer Center, Shizuoka, Japan; [g]Department of Gastroenterology, Kitasato University School of Medicine, Sagamihara, Japan; [h]Department of Gastroenterology, Yamagata Prefectural Central Hospital, Yamagata, Japan; [i]Department of Gastroenterology, Saitama Cancer Center Hospital, Saitama, Japan; [j]Cancer Chemotherapy Center, Osaka Medical College, Takatsuki, Japan; [k]Department of Gastrointestinal Medical Oncology, National Hospital Organization Shikoku Cancer Center, Matsuyama, Japan; [l]Division of Diabetes, Digestive and Kidney Diseases, Department of Clinical Molecular Medicine, Kobe University Graduate School of Medicine, Hyogo, Japan; [m]Division of Medical Oncology, Kochi Health Sciences Center, Kochi, Japan

Disclosures of potential conflicts of interest may be found at the end of this article.

Key Words. Prognostic index • Prognostic factor • Advanced gastric cancer • Chemotherapy

ABSTRACT

Background. In advanced gastric cancer (AGC), no globally accepted prognostic scoring system has been developed. Therefore, we explored baseline prognostic factors in Japanese AGC patients using the data from a randomized controlled trial, Japan Clinical Oncology Group (JCOG) 9912, which investigated the efficacy of systemic chemotherapy as a first-line treatment.

Patients and Methods. Prognostic factors and prognostic indices for overall survival were screened and evaluated in patients enrolled in JCOG9912 using the Cox proportional hazard model. The Royal Marsden Hospital prognostic model was also applied to the JCOG9912 trial.

Results. A total of 650 (92.3%) of the 704 patients randomized in the JCOG9912 trial, for whom complete data were available for multivariate analyses, was included in the present study (5-fluorouracil arm, $n = 215$; irinotecan plus cisplatin arm, $n = 216$; S-1 arm, $n = 219$). The median survival time (MST) for all patients was 11.8 months. To construct a prognostic index, we selected four risk factors by multivariate analysis: performance status ≥ 1, number of metastatic sites ≥ 2, no prior gastrectomy, and elevated alkaline phosphatase. MSTs were 17.0 months for patients categorized into the low-risk group, who had zero or one risk factor ($n = 225$); 10.4 months for patients in the moderate-risk group, who had two or three risk factors ($n = 368$); and 5.0 months for patients in the high-risk group, who had all four risk factors ($n = 57$).

Conclusion. In the present study, we propose a new prognostic index for patients with AGC. This can be used for more appropriate patient stratification in future clinical trials. ***The Oncologist*** 2014;19:1–9

Implications for Practice: Prognostic indices are useful not only to estimate the prognosis of each patient but are also applicable for stratification of patients for clinical trials. By using patient data from the Japan Clinical Oncology Group (JCOG) 9912 trial, we explored baseline prognostic factors and prognostic index. In the results, a novel prognostic index consisting of four risk factors (performance status ≥1, metastatic sites ≥2, no prior gastrectomy, and elevated ALP), which can classify patients into three risk groups, is proposed. This index can be used for more accurate patient stratification in future clinical trials.

INTRODUCTION

Despite a steady decrease in the mortality rate of gastric cancer (GC) in recent years, GC remains a major health problem, causing approximately 738,000 deaths worldwide in 2008 [1]. For advanced gastric cancer (AGC) patients, the primary treatment is systemic chemotherapy, which improves survival and quality of life [2, 3]. Whereas fluoropyrimidine plus

Correspondence: Daisuke Takahari, M.D., Ph.D., Department of Clinical Oncology, Aichi Cancer Center Hospital, 1-1 Kanokoden, Chikusa-ku, Nagoya 464-8681, Aichi, Japan. Telephone: 81-52-762-6111; E-Mail: dtakahari@aichi-cc.jp Received August 7, 2013; accepted for publication January 6, 2014. http://dx.doi.org/10.1634/theoncologist.2013-0306

