

TITLE: Capiivasertib in combination with enzalutamide for metastatic castration resistant prostate cancer after docetaxel and abiraterone: results from the randomized phase II RE-AKT trial

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Running title: *RE-AKT trial*: Capiivasertib plus enzalutamide in metastatic castration-resistant prostate cancer

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ABSTRACT

Background

PTEN loss and aberrations in PI3K/AKT signaling kinases associate with poorer response to abiraterone acetate (AA) in metastatic castration-resistant prostate cancer (mCRPC). In this study, we assessed antitumor activity of the AKT inhibitor capivasertib combined with enzalutamide in mCRPC with prior progression on AA and docetaxel.

Methods

This double-blind, placebo-controlled, randomized phase 2 trial, recruited men ≥ 18 years with progressing mCRPC and performance status 0-2 from 15 UK centers. Randomized participants (1:1) received enzalutamide (160mg orally, once daily) with capivasertib (400mg)/ placebo orally, twice daily on an intermittent (4 days on, 3 days off) schedule. Primary endpoint was composite response rate (RR): RECIST 1.1 objective response, $\geq 50\%$ PSA decrease from baseline, or circulating tumor cell count conversion (from ≥ 5 at baseline to < 5 cells/ 7.5 mL). Subgroup analyses by PTEN_{IHC} status were pre-planned.

Results: Overall, 100 participants were randomized (50:50); 95 were evaluable for primary endpoint (47:48); median follow-up was 43 months. RR were 9/47 (19.1%) enzalutamide/capivasertib and 9/48 (18.8%) enzalutamide/placebo (absolute difference 0.4% 90%CI -12.8 to 13.6, $p=0.58$), with similar results in the PTEN_{IHC} loss subgroup. Irrespective of treatment, OS was significantly worse for PTEN_{IHC} loss (10.1 months [95%CI: 4.6-13.9] vs 14.8 months [95%CI: 10.8-18]; $p=0.02$). Most common treatment-emergent grade ≥ 3 adverse events for the combination were diarrhea (13% vs 2%) and fatigue (10% vs 6%).

Conclusions: Combined capivasertib/enzalutamide was well tolerated but didn't significantly improve outcomes from abiraterone pre-treated mCRPC.

1

2 INTRODUCTION

3 Prostate cancer (PC) is one of the commonest causes of cancer-related death [1], with
4 a mainstay of its systemic therapy remaining androgen deprivation therapy (ADT) [2].
5 Metastatic disease invariably becomes castration-resistant (mCRPC), although
6 androgen receptor (AR) dependency continues [3]. This led to development of AR
7 pathway inhibitors (ARPI) including abiraterone acetate (AA), enzalutamide,
8 apalutamide and darolutamide [4-7]. Mechanisms of resistance to ARPI include but
9 are not limited to AR amplification, mutations [8] and constitutively active splice
10 variants [9].

11 PI3K/AKT pathway activation, mainly due to PTEN loss, is a mechanism of resistance
12 to AR blockade [10]. PTEN loss and aberrations in PI3K/AKT signaling kinases
13 (PIK3CA/PIK3CB/AKT1/AKT2) associate with worse outcomes and poorer response
14 to AA in mCRPC [11, 12]. This led to studies combining ARPIs with AKT blockade [13,
15 14]. Here, we present the RE-AKT trial that explored antitumor activity of capivasertib,
16 and enzalutamide compared to enzalutamide alone in men with mCRPC previously
17 treated with AA and docetaxel.

18

19 MATERIALS AND METHODS

20 Study design and participants

21 RE-AKT (ISRCTN17168679, NCT02525068) was a multicenter, double-blind,
22 placebo-controlled, randomized phase II trial (1:1) conducted in 15 UK centers
23 (**Appendix A**). Eligibility criteria included: age ≥ 18 years; 1-2 prior lines of taxane
24 therapy; ≥ 12 weeks of prior AA; histologic PC diagnosis; Eastern Cooperative

25 Oncology Group (ECOG) performance status 0–2; PSA \geq 10ng/ml; castrate serum
26 testosterone (full list in **Appendix B**). Patients provided written informed consent
27 before enrolment. The study was co-sponsored by The Royal Marsden Hospital and
28 The Institute of Cancer Research (ICR) UK; approved by a Research Ethics
29 Committee (14/LO/0259); coordinated centrally by The Clinical Trials and Statistics
30 Unit at ICR (ICR-CTSU); conducted to the principles of good clinical practice and
31 overseen by independent data monitoring and steering committees.

32 **Randomization and masking**

33 Eligible patients were randomly allocated (1:1) centrally using an interactive web
34 response system (IWRS, Cenduit Solutions) to receive enzalutamide/capivasertib or
35 enzalutamide/placebo. Allocation used a minimization algorithm with a random
36 element incorporated, with center, number of prior chemotherapy lines and prior
37 response to abiraterone as balancing factors. Participants and clinicians were masked
38 to treatment allocation.

39 **Procedures**

40 Participants received capivasertib 400mg or matching placebo, orally, twice daily on
41 an intermittent (4 days on and 3 days off) dosing schedule. Enzalutamide 160mg was
42 administered orally, once daily. Patients continued on study treatment until disease
43 progression (clinical or radiological), unacceptable toxicity or patient decision to
44 discontinue. Clinical assessments took place 1 and 2 weeks after the start of
45 treatment, then at the start of every new 4-week cycle, including monitoring of adverse
46 events (graded according to Common Terminology Criteria for Adverse Events
47 (CTCAE version 4.0), performance status, physical examination, routine bloods, and
48 symptom review. Pain was assessed using the Brief Pain Inventory Short Form (BPI-
49 SF) [15, 16].

50 Radiological assessments (CT and bone scans) were every 12 weeks. Circulating
51 tumor cell (CTC) counts were measured every 4 weeks for the first 12 weeks, and
52 thereafter every 12 weeks. CTC counts were not made available to the treating
53 physician. PSA serum measurements were collected every cycle if available, and
54 every 12 weeks at a minimum. Blood samples for correlative biomarker studies were
55 taken every 4 weeks.

56 PTEN protein immunohistochemical (PTEN_{IHC}) expression was determined as
57 previously described [11]. In short, nuclear and cytoplasmic staining intensity were
58 assessed by a pathologist blinded to clinical outcome data using H-scores [(% of weak
59 staining cells) x 1] + [(% of moderate staining cells) x 2] + [(% of strong staining cells)
60 x 3] ranging from 0 (minimum) to 300 (maximum). A binary classification scheme was
61 used with PTEN loss defined as H-score \leq 10.

62 **Outcomes**

63 The primary endpoint was response rate, defined as a composite of: radiological
64 objective response (by RECIST 1.1 [17]), a decrease in PSA of \geq 50% from baseline,
65 and conversion of CTC count (from \geq 5 at baseline to $<$ 5 cells per 7.5 mL blood). PSA
66 and CTC responses required confirmation in a second consecutive assessment at
67 least 4 weeks later and absence of radiological progression. In assessing response,
68 only PSA and CTC assessments from 12 weeks onwards (to coincide with the first
69 RECIST assessment) were considered, unless a PSA or CTC response was
70 maintained after 12 weeks of treatment (without radiological response at 12 weeks).

71 Secondary endpoints included: radiographic progression free survival (rPFS), defined
72 as the time from randomization to first RECIST 1.1 progression, bone scan
73 progression defined by Prostate Cancer Working Group 2 [18], or death; overall
74 survival (OS), defined as time from randomization to death; best percentage change

75 in PSA from baseline while on treatment, as well as at 12 weeks (or earlier if therapy
76 was discontinued); CTC count falls by 30%; maximal CTC percentage decline; CTC
77 percentage decline at 12 weeks; skeletal-related events (including palliative external-
78 beam radiotherapy, new symptomatic fractures, spinal cord compression, or tumor-
79 related orthopedical surgery); pain palliation using the BPI-SF worst pain intensity
80 score; and tolerability.

81 **Statistical Analyses**

82 Assuming a response rate of 17% with enzalutamide alone in the post-abiraterone and
83 docetaxel setting [19], 50 patients per group allowed the detection of at least 40%
84 response rate in the enzalutamide and capivasertib combination group (one-sided
85 $\alpha=0.05$, 82% power). For secondary time-to-event outcomes, we targeted a hazard
86 ratio of 0.60 (one-sided α 0.10; 80% power), requiring 70 events, and equating to an
87 increase in median PFS from 5 to 8.3 months when adding capivasertib, and in OS
88 from 10 to 16.7 months.

89 Populations of analysis included the intention to treat (ITT, all randomly assigned
90 participants), the safety population (SP, all who received at least one dose of either
91 study drug) and evaluable population for the analysis of the primary endpoint. The
92 latter was defined as all participants in the SP meeting all eligibility criteria; patients
93 were excluded from this population only if they discontinued treatment prior to 12
94 weeks for reasons considered unrelated to trial treatment or disease. Sensitivity
95 analyses of the primary endpoint on the ITT population were performed, with patients
96 discontinuing prior to 12-week assessments considered non-responders. Analysis of
97 all other efficacy endpoints were performed on the ITT population. Toxicity is reported
98 on the SP.

99 Response rates (RR) are reported with 95% confidence intervals (CIs). Treatment
100 effect is estimated by the absolute difference in RR, presented with 90% CI and one-
101 sided p-values from Fisher's exact test as per the trial design. Other estimates are
102 presented with 95% CIs. Percentage changes from baseline PSA, sum of target
103 lesions (RECIST 1.1), and CTC counts are presented as waterfall plots, and treatment
104 groups compared with Mann-Whitney tests. For rPFS, patients alive and without
105 progression are censored at last scheduled disease assessment. Patients alive at the
106 end of follow-up are censored for analysis of OS. Both endpoints are summarized by
107 Kaplan-Meier estimates, with median times reported and groups compared with the
108 log-rank test. BPI-SF was assessed using standard scoring algorithms [16] with a
109 focus on worst pain intensity score and analgesic score.

110 Pre-planned subgroup analyses to assess interaction of PTEN_{IHC} and treatment were
111 performed using logistic (for binary endpoints) or Cox proportional hazards (for time to
112 event endpoints) models with interaction terms and considered exploratory in nature.
113 Analyses are based on a database snapshot taken April 7, 2022, and performed with
114 Stata software (version 17).

115

116 **RESULTS**

117 Between 06/07/2016, and 06/09/2019, 137 patients were registered for screening; 100
118 were subsequently randomized (**Figure 1**). Median follow-up was 43 months. Baseline
119 characteristics are presented in **Table 1**. Although well balanced in terms of patient
120 demographics, diagnostic features, and previous treatments (**Table C.1**), in the
121 enzalutamide/placebo group fewer patients presented with RECIST-measurable
122 disease.

123 Ninety-eight patients (48 enzalutamide/capivasertib, 50 enzalutamide/placebo) were
124 included in the SP; two patients were found ineligible after randomization, before
125 starting study treatment. Median time on combination treatment was 2.9 months
126 (interquartile range (IQR): 0.9-6.3) for enzalutamide/capivasertib, 2.7 months (1.8-4.5)
127 for enzalutamide/placebo. Patients who discontinued capivasertib were permitted to
128 continue enzalutamide alone: 12 patients (25%) continued on enzalutamide alone for
129 a median of 2.4 months (1.5-7.6). Fifteen patients (31%) allocated to
130 enzalutamide/capivasertib and nine patients (18%) in the enzalutamide/placebo group
131 remained on study treatment for more than 6 months (**Figure 2A**).

132 *Antitumor activity*

133 Ninety-five patients (47 enzalutamide/capivasertib, 48 enzalutamide/placebo) were
134 evaluable for at least one component of the composite RR, with 72 (76%) evaluable
135 for RECIST 1.1 response, 82 (86%) for PSA response, and 80 (84%) for CTC
136 conversion. No differences in composite RR were observed between the groups: 9/47
137 (19.1%) enzalutamide/capivasertib vs 9/48 (18.8%) enzalutamide/placebo (absolute
138 difference 0.4% 90%CI -12.8 to 13.6, p=0.58; **Table 2**). Radiological response was
139 observed in 4/35 (11.4%) evaluable enzalutamide/capivasertib patients versus 5/37
140 (13.5%) with enzalutamide/placebo; PSA response was observed in 7/38 (18.4%) and
141 8/42 (19.0%), respectively; and CTC conversion in 2/29 (6.9%) and 5/34 (14.7%),
142 respectively.

143 There were no differences between treatment groups in percentage change from
144 baseline in PSA at 12 weeks (p=0.28, **Figure 2B**), best percentage change in CTC
145 counts while on treatment (p=0.24, **Figure 2C**), or in the sum of target lesions (p=0.70,
146 **Figure 2D**). Median rPFS in the enzalutamide/capivasertib group was 5.6 months
147 (95%CI: 2.8 to 8.3) and 3.5 months (95%CI: 2.8 to 5.6) in the enzalutamide/placebo

148 group, with a hazard ratio (HR) of 0.78 (95% CI: 0.47 to 1.30, $p=0.33$, **Figure 2E**).
149 Median OS for enzalutamide/capivasertib was 13.9 months (95%CI: 9.7 to 17.7), and
150 11.0 months (95%CI: 7.6 to 15.9) for enzalutamide/placebo, with HR 0.76 (95% CI:
151 0.51 to 1.15, $p=0.19$, **Figure 2F**).

152 Six (12%) enzalutamide/capivasertib patients experienced at least one skeletal event
153 compared to 14 (28%) enzalutamide/placebo patients (absolute difference 16%
154 95%CI 0.6 to 31.4, $p=0.04$). No statistically significant differences were found between
155 groups in changes in worst pain nor analgesic BPI-SF scores (**Table C.2**).

156 *Antitumor activity by PTEN_{IHC} status*

157 PTEN_{IHC} status was available in 92/100 patients (71/92 from diagnostic biopsies, 21/92
158 from fresh biopsies): 63/92 (68.5%) were PTEN_{IHC} normal and 29/92 (31.5%) PTEN_{IHC}
159 loss; PTEN_{IHC} was available in 88/95 (92.6%) evaluable patients, with 62/88 (70.5%)
160 PTEN_{IHC} normal, and 26/88 (29.5%) PTEN_{IHC} loss. Composite RR by PTEN_{IHC} status
161 is presented in **Table 2 and Table C.3**. A breakdown of composite RR by PTEN_{IHC}
162 status and biopsy type is presented in **Table C.4**. No significant differences were found
163 between treatment groups within each PTEN_{IHC} subgroup. Given the small number of
164 responses in the PTEN_{IHC} loss group, a formal test for interaction of PTEN_{IHC} and
165 treatment was not done.

166 Only one response was observed in 26 PTEN_{IHC} loss patients (3.8%) across both
167 treatment groups, while 17/62 responses (27.4%) were observed in PTEN_{IHC} normal
168 patients ($p=0.009$). This difference was demonstrated not only in PSA falls, but also
169 in RECIST responses and CTC counts (**Table C.3**). For PTEN_{IHC} normal patients,
170 similar composite response rates across treatment groups were seen:
171 enzalutamide/capivasertib 9/29 (31%) vs enzalutamide/placebo 8/33 (24.2%).

172 For all other efficacy endpoints, the role of PTEN_{IHC} loss as a biomarker for poor
173 outcome was confirmed (**Figure 3A and 3B, Figure D.2, Table C.5**). Median rPFS for
174 PTEN_{IHC} loss was 2.9 months (95%CI: 2.7 to 5.6) compared to 5.6 months (95%CI:
175 3.0 to 8.3) in PTEN_{IHC} normal patients (p=0.35). OS was significantly worse for
176 PTEN_{IHC} loss compared to PTEN_{IHC} normal patients, regardless of their treatment
177 (10.1 months [95%CI: 4.6 to 13.9] vs 14.8 months [95%CI: 10.8 to 18]; log-rank
178 p=0.02). We did not, however, find signals of differential effect of AKT inhibitor
179 treatment and PTEN_{IHC} status across all these endpoints (**Figure 3C and 3D**).

180 *Safety and tolerability*

181 Of the 98 patients starting treatment, 34 (72%) in the enzalutamide/capivasertib group
182 and 20 (40%) in the enzalutamide/placebo group had at least one dose reduction or
183 interruption during blinded treatment mainly due to adverse events (AE). Main
184 reasons for discontinuation of the combination were disease progression (65%
185 enzalutamide/capivasertib vs 74% enzalutamide/placebo), AE (25% vs 10%) and
186 patient or clinician's decision (10% vs 16%). Five patients (11%) in the
187 enzalutamide/capivasertib group continued to receive open label enzalutamide after
188 discontinuing the combination due to AE for a median of 4 further cycles (IQR: 3 – 8
189 cycles).

190 The most common treatment-emergent AE while on blinded treatment on the
191 enzalutamide/capivasertib vs enzalutamide/placebo group were fatigue (60% vs
192 52%), diarrhea (75% vs 30%), decreased appetite (38% vs 34%) and nausea (42% vs
193 30%) (**Figure D.2**). Most grade 3 or higher AE were diarrhea (13% vs 2%), fatigue
194 (10% vs 6%), anemia (10% vs 14%) and back pain (8% vs 4%). In the combination
195 group, one grade 4 toxicity (diarrhea) was considered related to capivasertib; one
196 further grade 5 event (intracranial hemorrhage resulting in death) was considered

197 unrelated to either treatment. All other non-prostate cancer deaths occurred >30 days
198 after discontinuing treatment and were considered unrelated to treatment. Ten serious
199 adverse reactions (SAR) were reported in five enzalutamide/capivasertib patients vs
200 three SAR in two enzalutamide/placebo patients (**Table C.6**).

201

202 **DISCUSSION**

203 Alterations in the PI3K/AKT/PTEN pathway occurs in up to 50% of mCRPC cancers
204 and are associated with cell proliferation and ARPI resistance [20]. Preclinical studies
205 showed crosstalk between AR and PI3K/AKT signaling and support dual inhibition
206 having superior antitumor activity, especially in PTEN-deficient tumors [21, 22].
207 Capivasertib is a potent and selective inhibitor of the three AKT isoforms that has been
208 investigated in multiple tumors including breast and PC [23]. A phase III trial recently
209 described that combining capivasertib with fulvestrant improved PFS compared to
210 fulvestrant alone in estrogen-receptor positive metastatic breast cancer previously
211 treated with aromatase inhibition [24]. In mCRPC, capivasertib in combination with
212 enzalutamide [14], or AA [25], has an acceptable toxicity profile with antitumor activity
213 reported. The phase I/II ProCAID trial evaluated capivasertib with docetaxel and
214 reported a significant improvement in OS for the combination [26]. Based on these
215 data, two phase III trials, CAPItello-280; (NCT05348577, docetaxel and capivasertib
216 in mCRPC) and CAPItello-281 (NCT04493853i, capivasertib and AA in PTEN-
217 deficient, de novo, metastatic, hormone-sensitive PC) are being pursued.

218 In our phase II trial, in a heavily pre-treated population after AA and docetaxel, we did
219 not find evidence of a difference in RR between enzalutamide/capivasertib and
220 enzalutamide/placebo. Nevertheless, a higher proportion of patients receiving
221 capivasertib stayed on study treatment for more than 6 months, and, albeit non-

222 statistically significant, larger rPFS and OS were also observed in the combination
223 group. Moreover, patients on enzalutamide/capivasertib had significantly fewer
224 skeletal events. The 4 days on/3 days off capivasertib schedule was well tolerated in
225 keeping with phase I data [14, 25]. It is noteworthy that in our Phase I we observed
226 that enzalutamide nearly halved capivasertib PK exposure [14], resulting in a lower
227 exposure than what had been observed in earlier studies of the compound, possibly
228 impacting on capivasertib efficacy in our study.

229 In our pre-planned biomarker analysis, the proportion of PTEN_{IHC} loss was slightly
230 lower than previously reported [11, 12]. However, we have confirmed in a prospective
231 trial the prognostic role of PTEN_{IHC} loss in late stage mCRPC. When stratifying by
232 PTEN_{IHC} status there was, however, no differential RR or rPFS between treatment
233 groups. Although PTEN_{IHC} loss is an established biomarker of sensitivity to the
234 combination of the AKT inhibitor ipatasertib and AA in mCRPC patients ARPI naïve
235 [13], other clinical experiences, as well as our data, would suggest this is not the case
236 in more advanced stages probably due to the expression of AR splice variants in these
237 tumors which are not blocked by enzalutamide[27].

238 Conclusions

239 The combination of capivasertib and enzalutamide is well tolerated but, at the levels
240 of PK exposure that can be attained in the presence of enzalutamide, does not
241 increase antitumor activity compared to enzalutamide alone in post abiraterone and
242 taxane mCRPC.

243

244

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Data sharing

The ICR-CTSU supports the wider dissemination of information from its research and increased cooperation between investigators. Trial data are collected, managed, stored, shared, and archived according to ICR-CTSU Standard Operating Procedures to ensure the enduring quality, integrity, and utility of the data. Formal requests for data sharing are considered in line with ICR-CTSU procedures with due regard given to funder and sponsor guidelines. Requests are via a standard proforma describing the nature of the proposed research and extent of data requirements. Data recipients are required to enter a formal data sharing agreement that describes the conditions for release and requirements for data transfer, storage, archiving, publication, and intellectual property. Requests are reviewed by the Trial Management Group (TMG) in terms of scientific merit and ethical considerations including patient consent. Data sharing is undertaken if proposed projects have a sound scientific or patient benefit rationale as agreed by the TMG and approved by the Independent Data Monitoring and Steering Committee as required. Restrictions relating to patient confidentiality and consent will be limited by aggregating and anonymising identifiable patient data. Additionally, all indirect identifiers that could lead to deductive disclosures will be removed in line with Cancer Research UK Data Sharing Guidelines.

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Tables

Table 1. Baseline Characteristics

	Enzalutamide/capivasertib (N=50)		Enzalutamide/placebo (N=50)	
	n	%	n	%
Age (years)*	72.3(67.5, 77.9)		71.5 (67.7, 76.2)	
Ethnicity				
White	47	94	50	100
Other	3	6	0	0
Primary tumor staging at diagnosis (T)				
T0/T1	1	2	2	4
T2	11	22	3	6
T3	16	32	24	48
T4	9	18	6	12
Unknown	13	26	15	30
Lymphadenopathy at diagnosis (N)				
N0	16	32	19	38
N1/N2	19	38	13	26
Unknown	15	30	18	36
Metastatic disease at diagnosis				
M1	30	60	29	58
Total Gleason score at diagnosis				
≤7	22	44	23	46
≥8	20	40	17	34
Unknown	8	16	10	20
Time since histological confirmation of prostate cancer (years)*	6.7 (4.2, 11.1) n=48		5.9 (2.9, 8.7) n=49	
Time since confirmation of castrate resistant disease (years) *	3.7 (2.4, 5.4) n=47		3.7 (2.6, 5.4) n=50	
Disease presentation at trial entry				
Measurable soft-tissue disease (+/- bone lesions)	31	62	25	50
Non-measurable soft-tissue disease (+/-bone lesions)	10	20	8	16
Bone lesions only	9	18	17	34
Site of metastatic disease at trial entry**				
Lung	8	16	8	16
Lymph node	33	66	27	54
Liver	7	14	8	16
Bone	46	92	47	94
CTC count at trial entry				
CTC<5	17	34	12	24
CTC≥5	33	66	38	76
PSA at trial entry (ng/ml) *	144.2 (60, 240.3)		245 (79.3, 591)	
Prior lines of chemotherapy***				
One	29	58	29	58
Two	21	42	21	42
Prior response to abiraterone? ***				
No	17	34	16	32
Yes	33	66	34	68
PTEN Status				
PTEN Normal	29	58	33	66
PTEN Loss	16	32	14	28
Unknown	5	10	3	6

* Presented as median (first Q1- third Q3 quartiles)

**Patients may have reported more than 1 lesion site

*** Balancing factors at randomisation; Response to abiraterone pre-defined in the protocol as ≥50% PSA decline or RECIST 1.1 ORR

Table 2. Antitumor activity (measured by composite response) by treatment group (evaluable population)

	Enzalutamide/capivasertib				Enzalutamide/placebo				Difference %		p-value
	N	R	%R	95%CI	N	R	%R	95%CI	Diff	90%CI	
Composite response	47	9	19.1	(9.1 33.3)	48	9	18.8	(8.9 32.6)	0.4	(-12.8 13.6)	0.58
RECIST 1.1 response	35	4	11.4	(3.2 26.7)	37	5	13.5	(4.5 28.8)	-2.1	(-14.9 10.7)	
Confirmed PSA fall >=50%	38	7	18.4	(7.7 34.3)	42	8	19.0	(8.6 34.1)	-0.6	(-15.0 13.7)	
Confirmed CTC conversion	29	2	6.9	(0.8 22.8)	34	5	14.7	(5.0 31.1)	-7.8	(-20.4 4.8)	
RECIST 1.1 or PSA response	39	8	20.5	(9.3 36.5)	43	8	18.6	(8.4 33.4)	1.9	(-12.5 16.3)	0.52
Composite response by PTEN_{IHC} status											
PTEN _{IHC} Normal (N=62)	29	9	31.0	(15.3 50.8)	33	8	24.2	(11.1 42.3)	6.8	(-11.9 25.5)	0.38
PTEN _{IHC} Loss (N=26)	13	0	0.0	(0.0 24.7)	13	1	7.7	(0.2 36.0)	-7.7	(-19.8 4.5)	0.50

N: number of patients

R: Number of responses

%R: Response Rate, 95%CI: 95% exact confidence interval for proportions; 90% CI: normal approximation for difference of proportions

P-value: 1-sided exact Fisher's test

Figures (Color should be used for all figures in print)

Figure 1: Consort diagram

Figure 2. Antitumor activity by allocated treatment group

Footnote for Figure 2:

a) Swimmer plot of time on treatment for each patient according to treatment group, indicating periods where enzalutamide/capivasertib, patients received enzalutamide alone. Treatment periods of ≥ 6 months and ≥ 12 months are highlighted. PSA=prostate-specific antigen. b) Percentage change from baseline in PSA at 12 weeks. c) Best percentage change from baseline in CTC at any time during allocated treatment. d) Best percentage change from baseline in sum of target lesions at any time during allocated treatment e)) Kaplan Meier curve for radiographic progression-free survival by treatment group. f) Kaplan Meier curve for overall survival by treatment group.

ENZ: enzalutamide, CAP: capivasertib, PLA: placebo

Figure 3. Exploring role of PTEN_{IHC} as prognostic or predictive marker

Footnote for Figure 3:

a) Radiographic Progression-Free Survival by PTEN_{IHC} status. b) Overall Survival by PTEN_{IHC} status. c) Radiographic Progression-Free Survival by PTEN_{IHC} status and treatment group. d) Overall Survival by PTEN_{IHC} status and treatment group.

ENZ: enzalutamide, CAP: capivasertib, PLA: placebo