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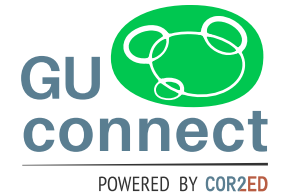


MEETING SUMMARY
ESMO 2019, Barcelona, Spain

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Huntsman Cancer Institute,
University of Utah, USA

GENITOURINARY UPDATE

DISCLAIMER



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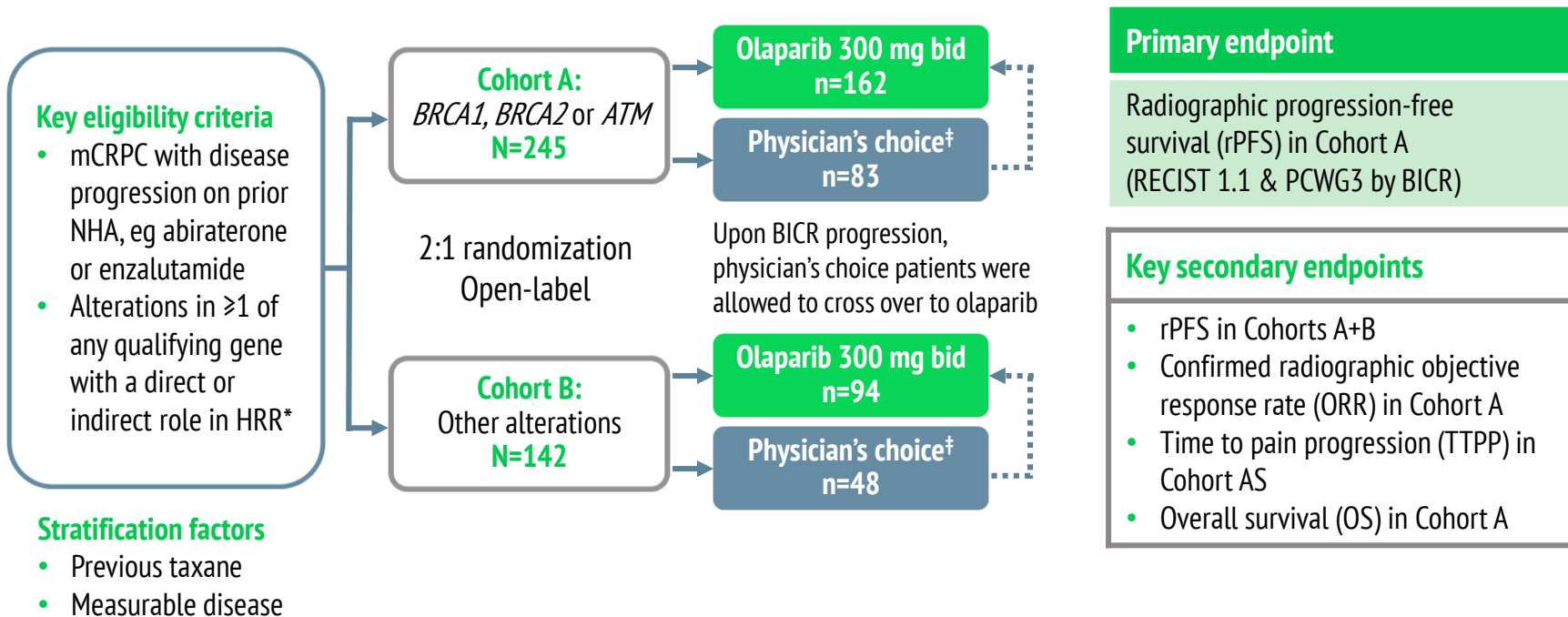
**TOP 4 HIGH-IMPACT GENITOURINARY
PRESENTATIONS AT ESMO 2019**

**PROfound:
PHASE 3 STUDY OF OLAPARIB VS
ENZALUTAMIDE OR ABIRATERONE FOR
mCRPC WITH HOMOLOGOUS
RECOMBINATION REPAIR GENE
ALTERATIONS**

Hussain, et al. ESMO 2019 Abstract #LBA12

- **mCRPC is molecularly heterogenous** and **up to 30% of mCRPC harbours deleterious alterations in DNA damage repair genes**, including those with direct and indirect roles in homologous recombinant repair (HRR)¹⁻³
- **These gene alterations are associated with response to PARP inhibition** of which *BRCA1*, *BRCA2* and *ATM* are the most well characterised⁴⁻⁷
- **Anti-tumour activity has been reported with the PARP inhibitor, olaparib**, in patients with prostate cancer harbouring HRR alterations^{6,7}
- **PROfound is the first randomised prostate cancer trial to use biomarker selection** to identify which mCRPC patients may respond to treatment⁸

PROfound STUDY DESIGN



*An investigational clinical trial assay, based on the FoundationOne[®] CDx next-generation sequencing test:-

Used to prospectively select patients harbouring alterations in *BRCA1, BRCA2, ATM, BARD1, BRIP1, CDK12, CHEK1, CHEK2, FANCL, PALB2, PPP2R2A, RAD51B, RAD51C, RAD51D* and/or *RAD54L* in their tumour tissue

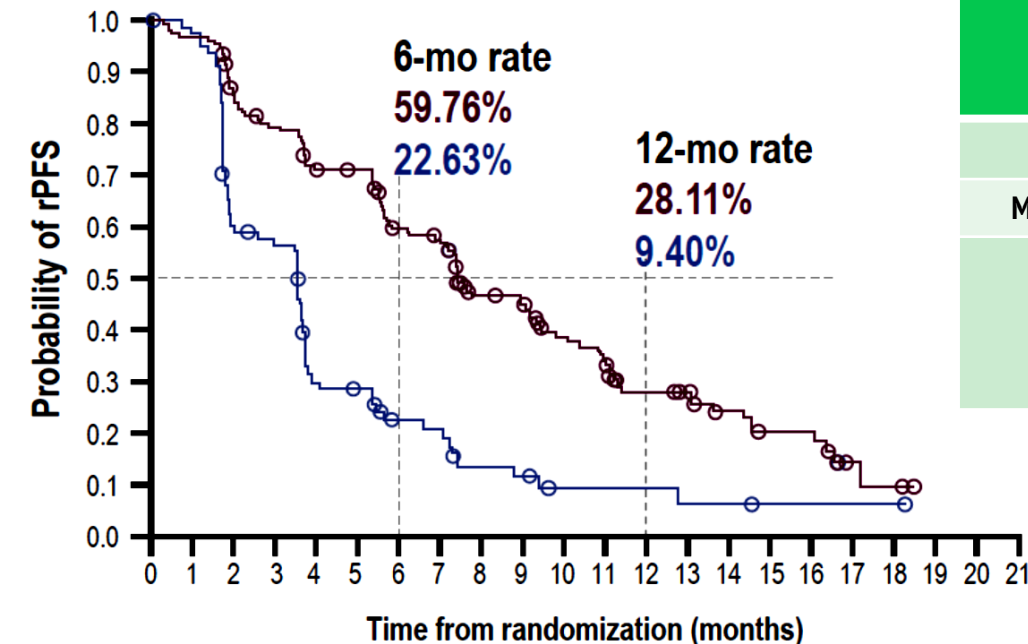
[‡]Physicians choice of either enzalutamide (160 mg qd) or abiraterone (1000 mg qd + prednisone (5mg bid)

Median treatment duration was 7.4 months for olaparib and 3.9 months for enzalutamide/abiraterone.

BICR, blinded independent central review; bid, twice daily; HRR, homologous recombination repair; mCRPC, metastatic castration resistant prostate cancer; NHA, new hormonal agent; ORR, objective response rate; OS, overall survival; PCWG3, prostate cancer working group 3; qd, once daily; RECIST, response evaluation criteria in solid tumours; rPFS, radiographic progression free survival; TTPP, time to pain progression
Hussain, M et al. Presented at ESMO 2019 Abstract #LBA12.

PROfound STUDY – PRIMARY ENDPOINT

rPFS BY BICR IN PATIENTS WITH ALTERATIONS IN *BRCA1*, *BRCA2* OR *ATM* (COHORT A)



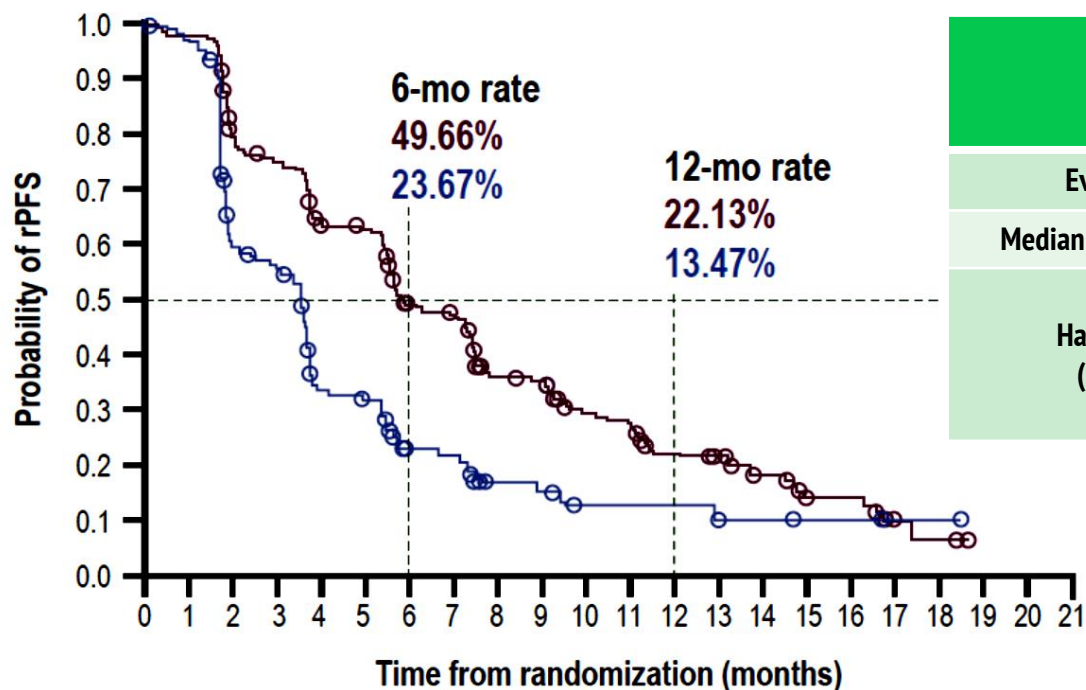
| | Olaparib (N=162) | Physician's choice (N=83) |
|-----------------------|------------------|---------------------------|
| Events (%) | 106 (65.4) | 68 (81.9) |
| Median rPFS (months) | 7.39 | 3.55 |
| Hazard ratio (95% CI) | 0.34 | |
| | (0.25-0.47) | |
| | P<0.0001 | |

| No. at risk | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|--------------------|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Olaparib | 162 | 149 | 126 | 116 | 102 | 101 | 82 | 77 | 56 | 53 | 42 | 37 | 26 | 24 | 18 | 11 | 11 | 3 | 2 | 0 | 0 | 0 |
| Physician's choice | 83 | 79 | 47 | 44 | 22 | 20 | 13 | 12 | 7 | 6 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |

- rPFS benefit with olaparib treatment was consistent across all subgroups studied

PROfound STUDY – KEY SECONDARY ENDPOINT

rPFS BY BICR IN OVERALL POPULATION (COHORT A+B)



| | Olaparib (N=256) | Physician's choice (N=131) |
|-----------------------|------------------|----------------------------|
| Events (%) | 180 (70.3) | 99 (75.6) |
| Median rPFS (months) | 5.82 | 3.52 |
| Hazard ratio (95% CI) | 0.49 | |
| | (0.38-0.63) | |
| | P<0.0001 | |

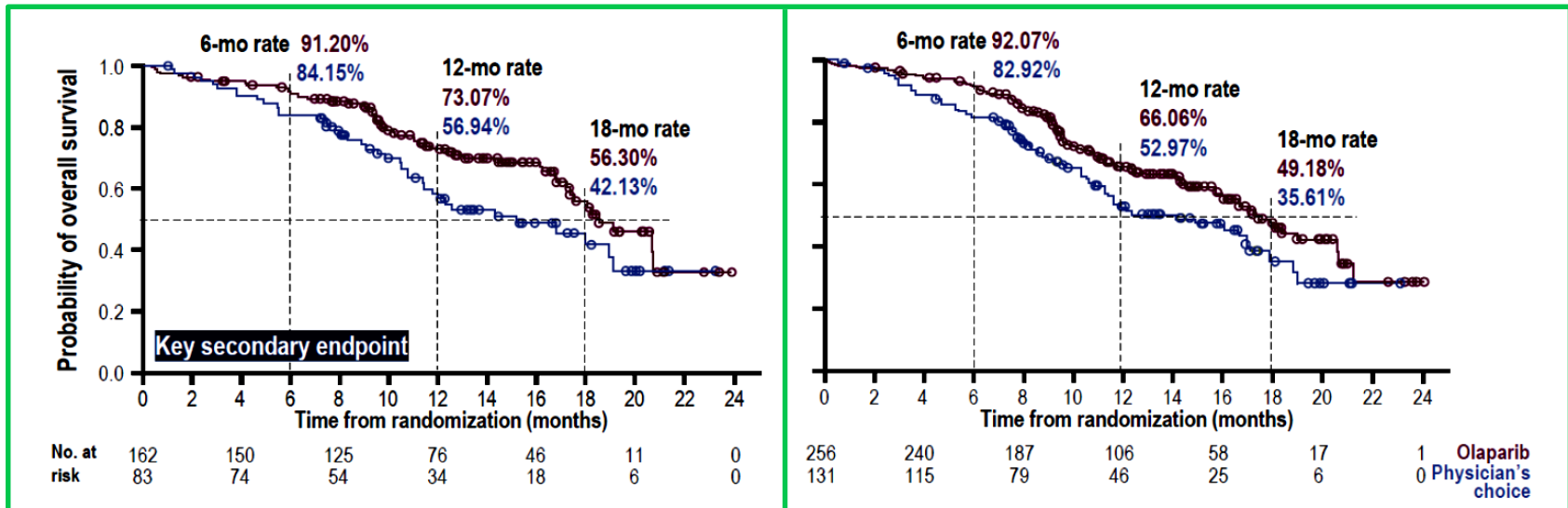
| No. at risk | 256 | 188 | 145 | 106 | 67 | 48 | 31 | 21 | 11 | 2 | 0 | Olaparib |
|-------------|-----|-----|-----|-----|----|----|----|----|----|---|---|--------------------|
| | 131 | 73 | 38 | 20 | 9 | 5 | 5 | 3 | 2 | 1 | 0 | Physician's choice |

PROfound STUDY – KEY SECONDARY ENDPOINT

INTERIM* OVERALL SURVIVAL

| COHORT A | Olaparib (N=162) | Physician's choice (N=83) |
|-----------------------|-------------------------------|---------------------------|
| Median OS (months) | 18.50 | 15.11 |
| Hazard ratio (95% CI) | 0.64 (0.43-0.97) P=0.0173‡ | |

| COHORT A+B | Olaparib (N=256) | Physician's choice (N=131) |
|-----------------------|--|----------------------------|
| Median OS (months) | 17.51 | 14.26 |
| Hazard ratio (95% CI) | 0.67 (0.49-0.93) P=0.0063 (nominal) | |



- Of the physician's choice arm patients who progressed, 80.6% in cohort A and 84.6% in cohort B crossed over to olaparib

*38% maturity in Cohort A; 41% maturity in Cohort A+B; final analysis planned after ~146 deaths in cohort A (60% maturity).

‡ alpha spend at interim was 0.01; statistical significance not reached

CI, confidence interval; OS, overall survival

Hussain M, et al. Presented at ESMO 2019 Abstract #LBA12.

PROfound STUDY – OTHER RESULTS

- Patients in cohort A had a confirmed ORR of 33.3% for olaparib compared to 2.3% for enzalutamide/abiraterone (OR 20.86, 95% CI: 4.18-379.18, $p < 0.0001$)
- No advantage to olaparib for cohort B patients in terms of rPFS (BICR) (HR 0.88, 95% CI: 0.58-1.36) or in OS (HR 0.73, 95% CI: 0.45-1.23)
- Olaparib was tolerated with a safety profile consistent with that observed in other cancers

SUMMARY

- **Olaparib treatment was associated with statistically significant and clinically relevant improvements in BICR rPFS** compared to enza/abi in mCRPC patients with:-
 - Alterations in *BRCA1*, *BRCA2* and/or *ATM*
 - Alterations in any qualifying gene with a direct/indirect role in HRR
- **PROfound will establish olaparib as standard of care** for this patient population and is likely to be the first approval for a biomarker selected treatment for prostate cancer

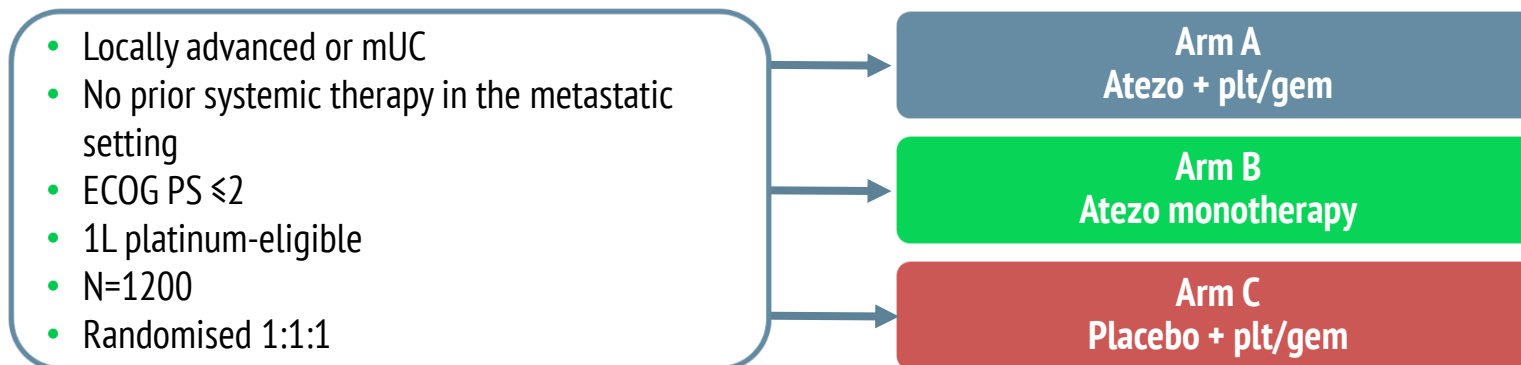
**IMvigor130: A PHASE 3 STUDY OF
ATEZOLIZUMAB AS MONOTHERAPY OR
COMBINED WITH PLATINUM-BASED
CHEMOTHERAPY (PBC) VS PLACEBO +PBC
IN PREVIOUSLY TREATED LOCALLY
ADVANCED OR METASTATIC UC**

Grande, et al. ESMO 2019 Abstract #LBA14

BACKGROUND

- **Current standard of care** for patients with mUC is **platinum based chemotherapy** as first line treatment
- Approximately **50%** of **patients with mUC** are **ineligible for treatment with cisplatin**
- **PD-L1 and PD-1 inhibitors are the first new therapies for mUC** in those patients experiencing disease progression after first line chemotherapy OR those ineligible for any chemotherapy OR who are ineligible for cisplatin chemotherapy with a high level of PD-L1 expression by the tumours
- **Atezolizumab** is an anti-PD-L1 which is being **investigated in the IMvigor130** study

IMvigor130 STUDY DESIGN



Stratification factors:

- PD-L1 IC status (IC0 vs IC1 vs IC2/3)
- Bajorin risk factor score including KPS $< 80\%$ vs $\geq 80\%$ and presence of visceral metastases (0 vs 1 vs 2 and/or patients with liver metastases)
- Investigator choice of plt/gem (cisplatin + gem or carboplatin + gem)

*per RECIST 1.1

Co-primary endpoints:

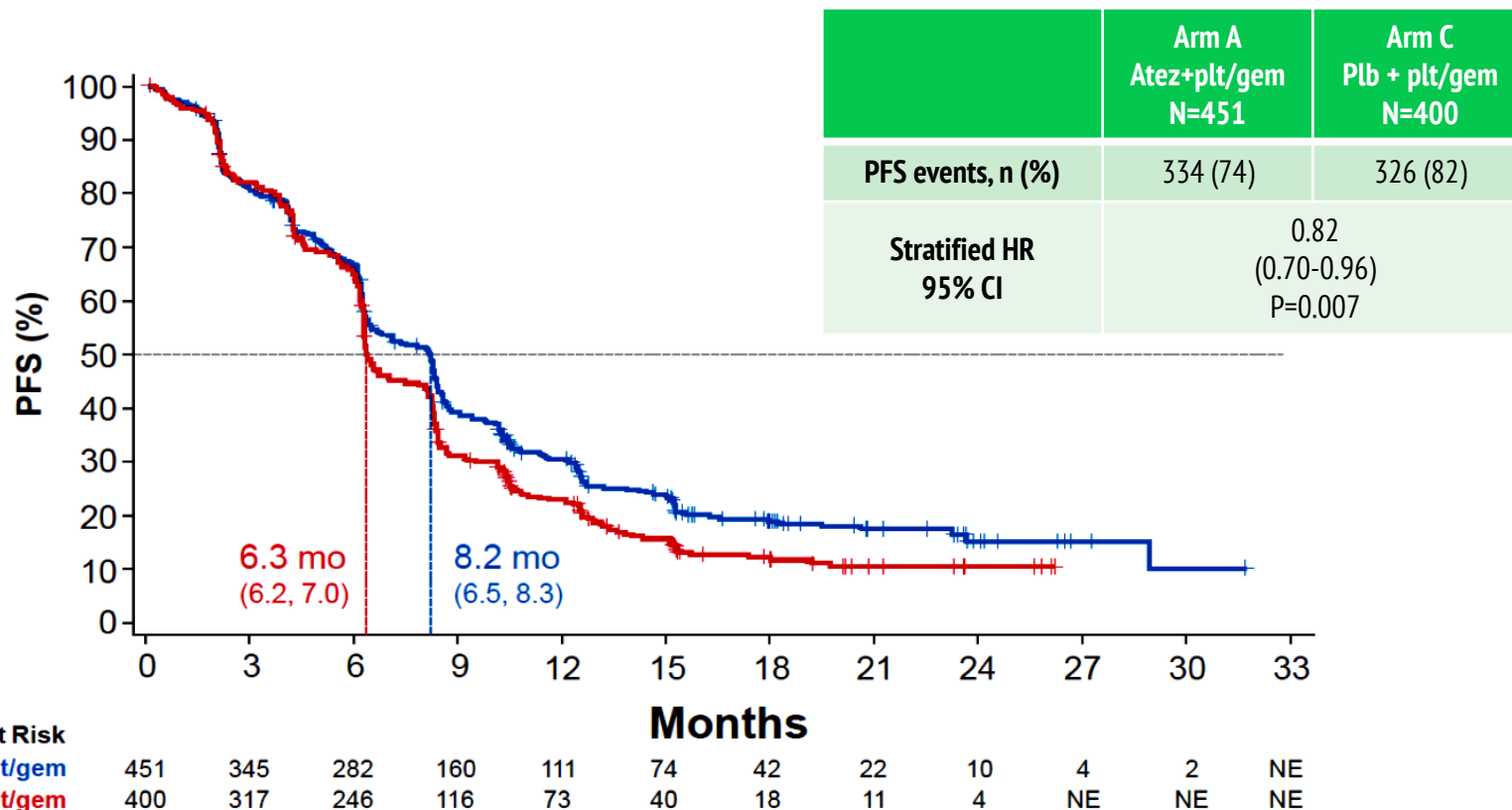
- INV-assessed PFS* and OS (Arm A vs C)
- OS (Arm B vs C, hierarchical approach)

Key secondary endpoints:

- INV-ORR* and DOR
- PFS* and PS (Arm B vs C; PD-L1 IC2/3 subgroup)
- Safety

IMvigor STUDY: CO-PRIMARY ENDPOINT

FINAL PFS: ITT (ARM A VS ARM C)

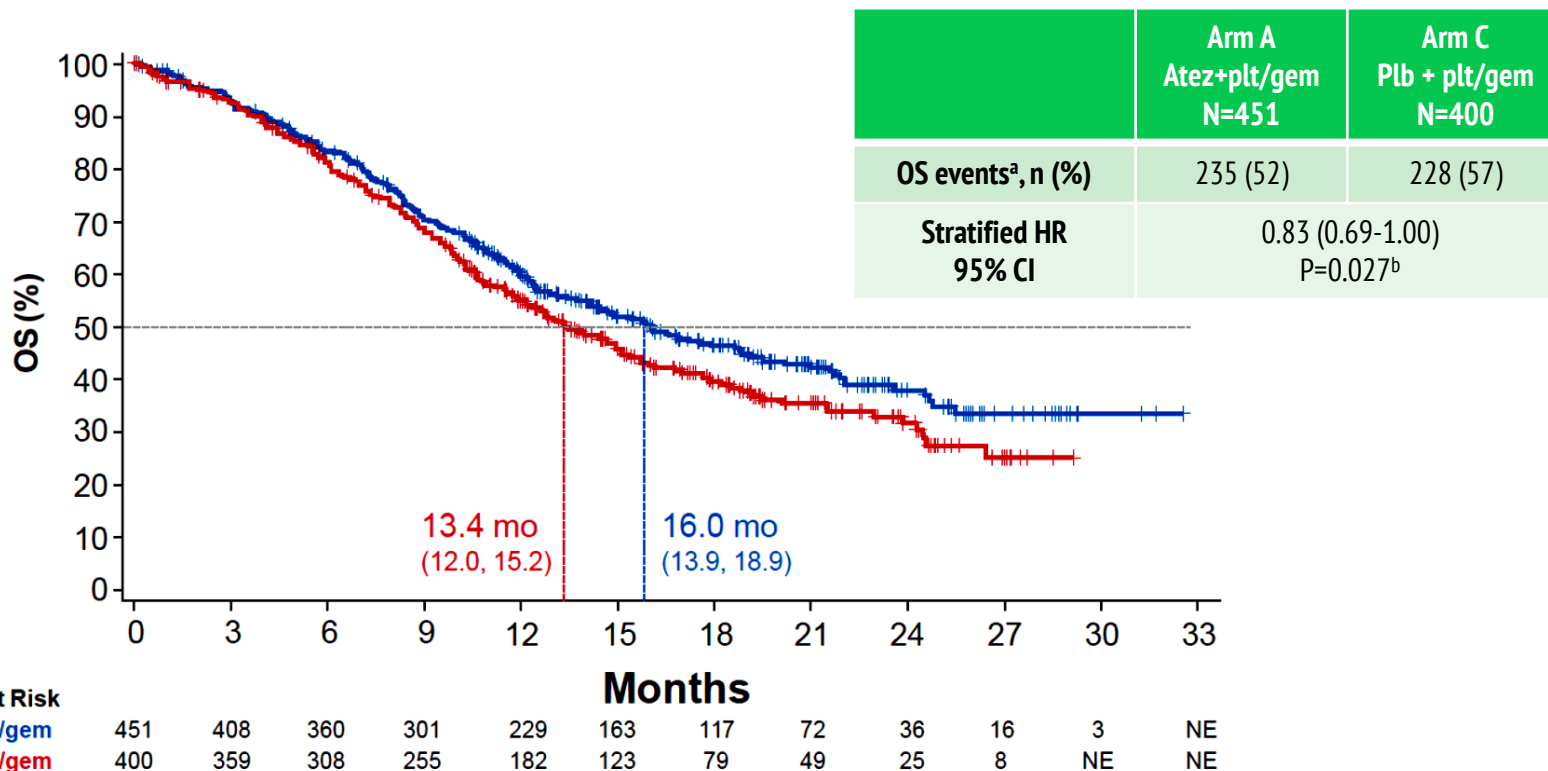


- PFS benefit with atezolizumab plus platinum/gemcitabine treatment was consistent across subgroups

Atez, atezolizumab; CI, confidence interval; HR, hazard ratio; ITT, intention to treat; PFS, progression free survival, Plb, placebo; plt/gem, platinum (cisplatin or carboplatin) plus gemcitabine

IMvigor STUDY: CO-PRIMARY ENDPOINT

INTERIM OS: ITT (ARM A VS ARM C)



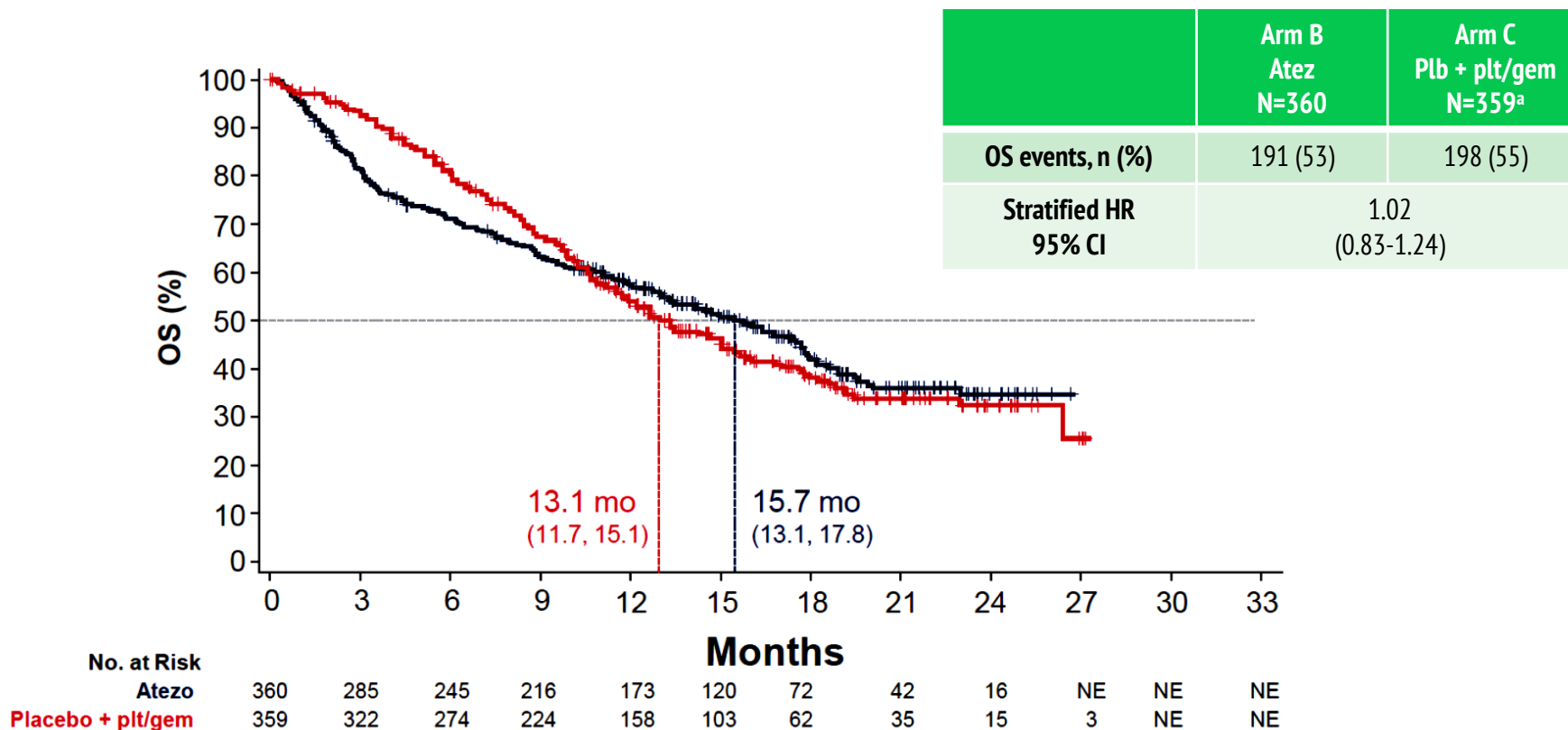
Median survival follow up of 11.8 months (all patients); ^a5% of patients from Arm A and 20% of patients from Arm C received non-protocol immunotherapy; ^bDid not cross the interim efficacy boundary of 0.007 per the O'Brien-Fleming alpha spending function

- There was a trend to OS benefit with atezolizumab plus platinum/gemcitabine treatment but the data are not mature at this point

Atez, atezolizumab; CI, confidence interval; HR, hazard ratio; ITT, intention to treat; OS, overall survival, Plb, placebo; plt/gem, platinum (cisplatin or carboplatin) plus gemcitabine

IMvigor STUDY: CO-PRIMARY ENDPOINT

INTERIM OS FOR MONOTHERAPY: ITT (ARM B VS ARM C)



Median survival follow up of 11.8 months (all patients); ^aComparison only includes patients concurrently enrolled with ArmB

Atez, atezolizumab; CI, confidence interval; HR, hazard ratio; ITT, intention to treat; OS, overall survival, Plb, placebo; plt/gem, platinum (cisplatin or carboplatin) plus gemcitabine

Grande E, et al. Presented at ESMO 2019 Abstract #LBA14.

SUMMARY

- This is the **first immune checkpoint inhibitor study to demonstrate an improvement in PFS over standard of care in first line mUC**
- The **OS data was immature** at the time of this interim analysis
- The **atezolizumab + plt/gem combination** was **well tolerated** with a safety profile consistent with the individual agents
- **These data are sufficiently robust to change clinical practice and we await approval by regulatory bodies**
- Multiple other trials are currently ongoing investigating the effects of pembrolizumab, immune checkpoint combinations and switch maintenance therapies
- In the near future, these trials are likely to move immune checkpoint inhibitors from second line therapy to first line therapy in mUC

mUC, metastatic urothelial cancer; PD-L1, programmed death-ligand 1; PFS, progression free survival; plt/gem, platinum (cisplatin or carboplatin) plus gemcitabine

Grande E, et al. Presented at ESMO 2019 Abstract #LBA14.

**TITAN:
PHASE III STUDY OF APALUTAMIDE
AND PLACEBO IN mHSPC
PATIENTS RECEIVING ADT
(PATIENT REPORTED OUTCOMES)**

Agarwal, et al. ESMO 2019 Abstract #851PD

- **TITAN investigated the effect of apalutamide (androgen receptor inhibitor) in combination with ADT in men with mCSPC**
 - The addition of apalutamide to ADT improved the dual primary endpoint of rPFS and OS
 - Results of the trial led to approval of apalutamide by the FDA for mCSPC in Sept 2019¹
- **Patient-reported outcomes were prespecified exploratory endpoints in TITAN and were assessed using the BPI-SF, BFI, FACT-P, and EQ-5D-5L**
 - BPI-SF and BFI were completed for 7 consecutive days (days –6 plus day 1 of each cycle visit), then at months 4, 8, and 12 in follow-up
 - FACT-P and EQ-5D-5L were completed during cycles 1–7, then every other cycle until the end of treatment, and at months 4, 8, and 12 in follow-up
 - Analyses were based on the intention-to-treat population

TITAN MAIN STUDY DESIGN

“All-comer” patient population

Key eligibility criteria:

- Castration sensitive
- Distant metastatic disease by ≥ 1 lesion on bone scan
- ECOG PS 0 or 1

On-study requirement:

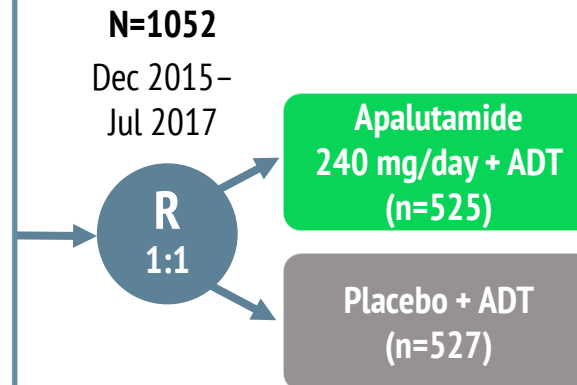
- Continuous ADT

Permitted:

- Prior docetaxel
- ADT ≤ 6 mo for mCSPC or ≤ 3 yr for local disease
- Local treatment completed ≥ 1 yr prior

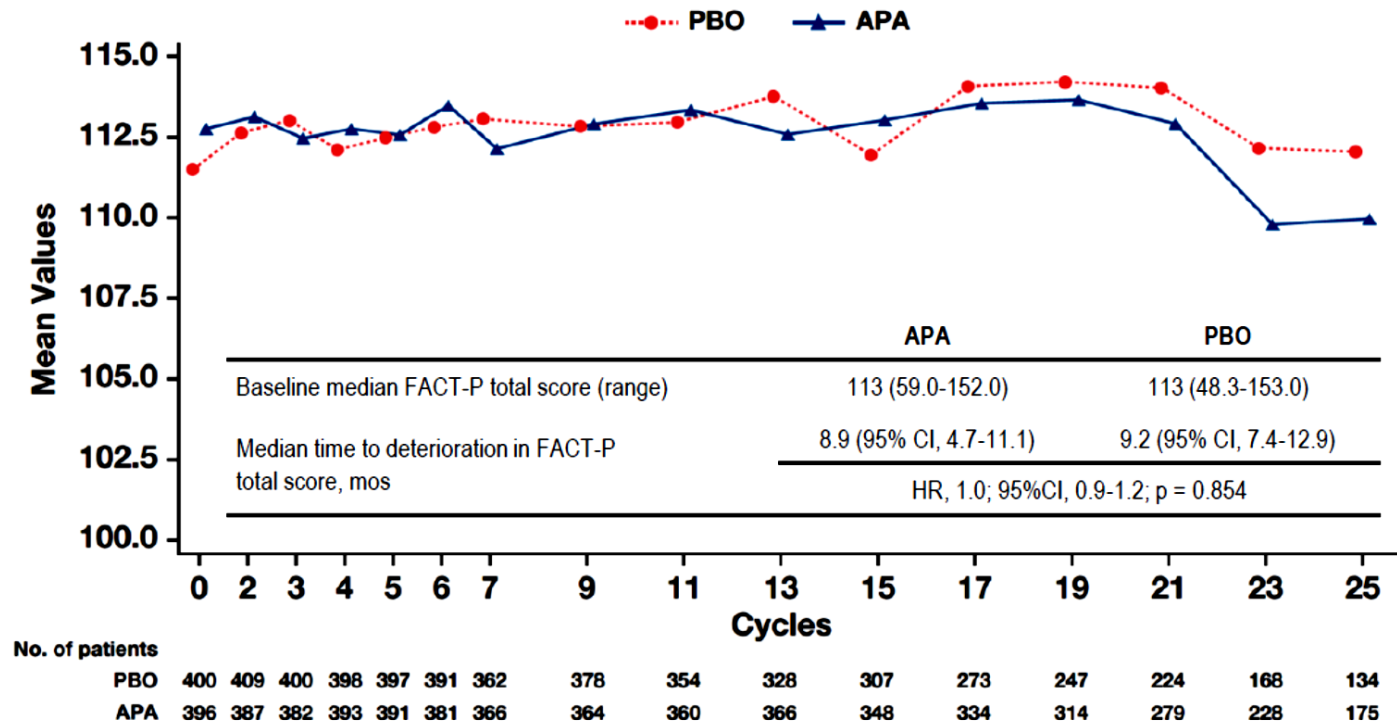
Stratifications:

- Gleason score at diagnosis (≤ 7 vs ≥ 8)
- Region (NA and EU vs all other countries)
- Prior docetaxel (yes vs no)



- Patient reported outcomes were pre-specified exploratory endpoints

TITAN – HRQoL WAS PRESERVED WITH THE ADDITION OF APALUTAMIDE TO ADT (FACT-P)



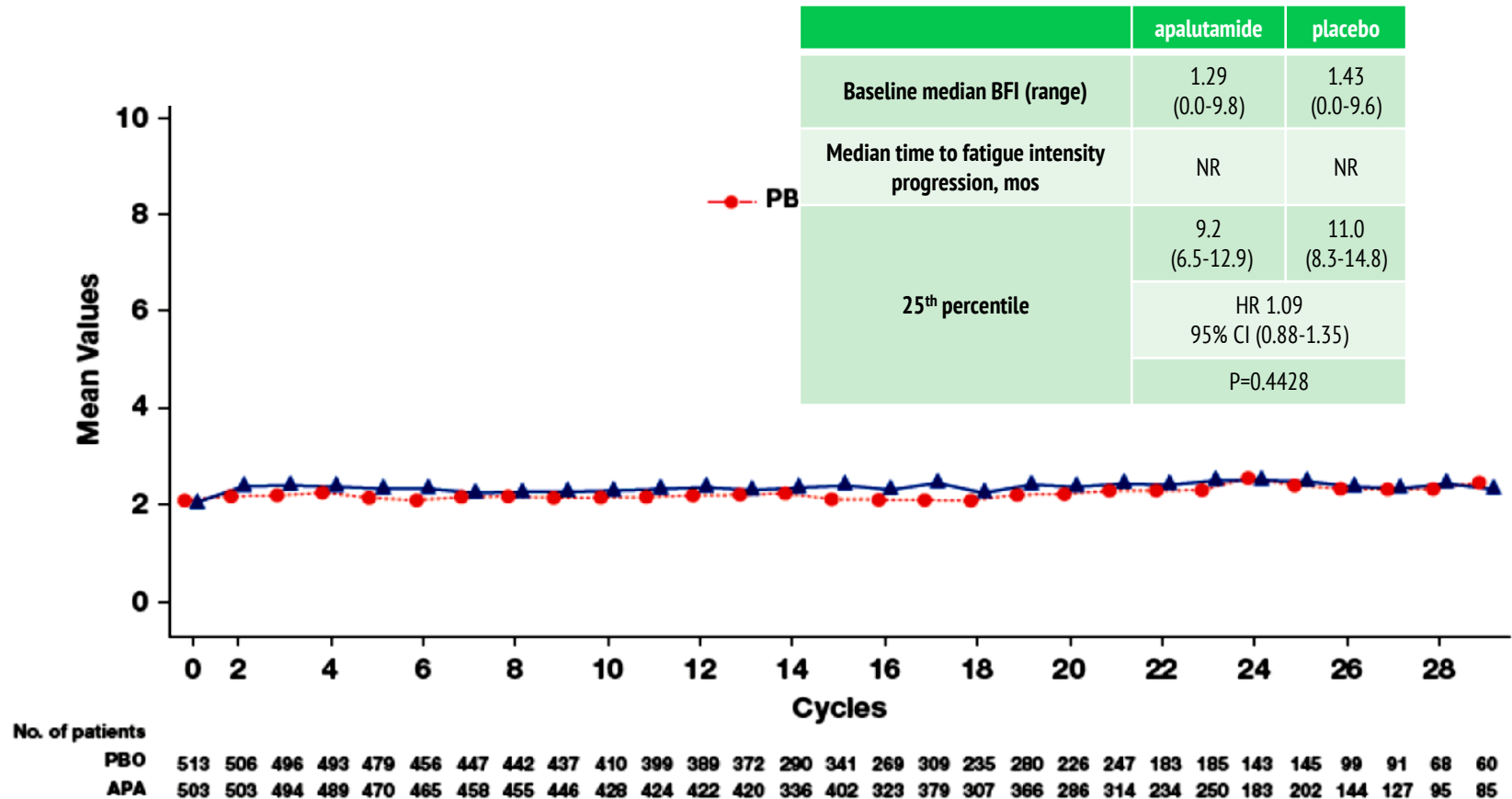
- FACT-P values were similar with apalutamide or placebo

ADT, androgen deprivation therapy; APA, apalutamide; CI, confidence interval; FACT-P, functional assessment of cancer therapy-prostate; HR, hazard ratio; HRQoL, health related quality of life; PBO, placebo

Agarwal N, et al. ESMO 2019 Abstract #851PD; Agarwal, N et al. Lancet Oncology 2019;doi:10.1016/S1470-2045(19)30620-5

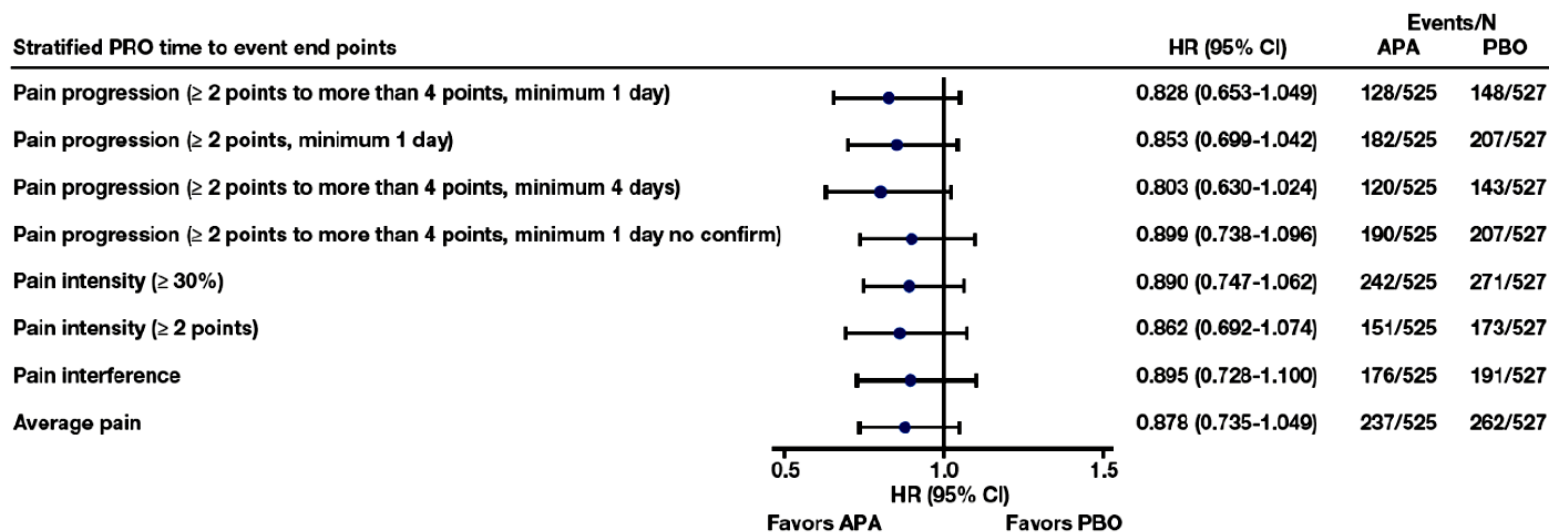
TITAN – ADDITION OF APALUTAMIDE TO ADT DID NOT INCREASE FATIGUE (BFI)

GROUP MEAN VALUES FOR WORST FATIGUE INTENSITY



ADT, androgen deprivation therapy; APA, apalutamide; BFI, brief fatigue inventory; CI, confidence interval; HR, hazard ratio; NR, not reached; PBO, placebo

TIME TO PAIN PROGRESSION FAVOURED APALUTAMIDE



- Results of sensitivity and exploratory analyses were consistent with time to pain progression endpoint results, with all HRs favouring apalutamide

SUMMARY

- The **combination of apalutamide in addition to ADT significantly improved survival outcomes** in patients with mCSPC compared with ADT alone **while maintaining HRQoL** despite additive androgen blockade
- One of the **most commonly discussed side effects of treatment with androgen receptor blockers is fatigue** and this was found to be **similar between treatment arms**

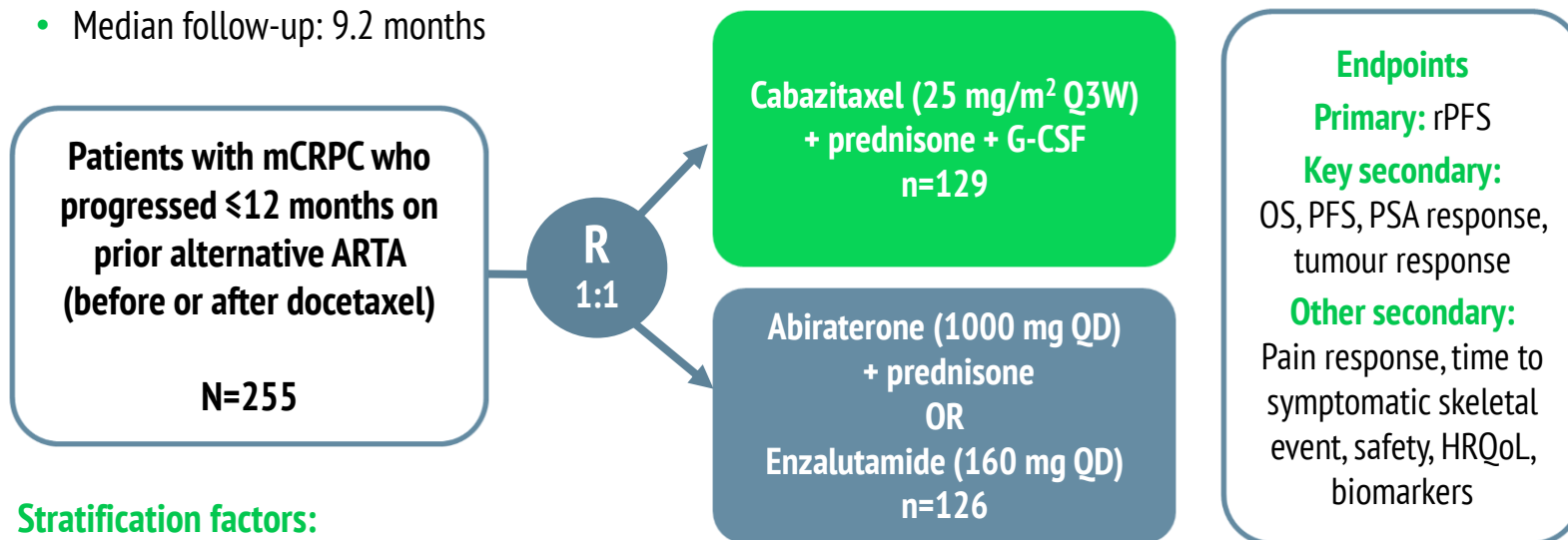
**CARD:
RANDOMISED, OPEN LABEL STUDY OF
CABAZITAXEL VS ABIRATERONE OR
ENZALUTAMIDE IN mCRPC**

de Wit, et al. ESMO 2019 Abstract #LBA13

- **Several agents are approved for mCRPC but the optimal treatment sequence remains unclear**
- Prior mCRPC trials have not compared the ‘new’ agent with current standard therapy
- The **CARD** trial **investigated** the **best treatment option for mCRPC** patients previously treated with docetaxel, currently progressing on an ART such as abiraterone or enzalutamide, within 12 months of starting therapy with ART:
 - Should the next treatment be an ART not already tried
 - Should the next treatment be a cytotoxic, ie. cabazitaxel

CARD STUDY DESIGN

- Multicenter, randomized, open-label study
- Enrollment: Nov 2015 – Nov 2018
- Median follow-up: 9.2 months

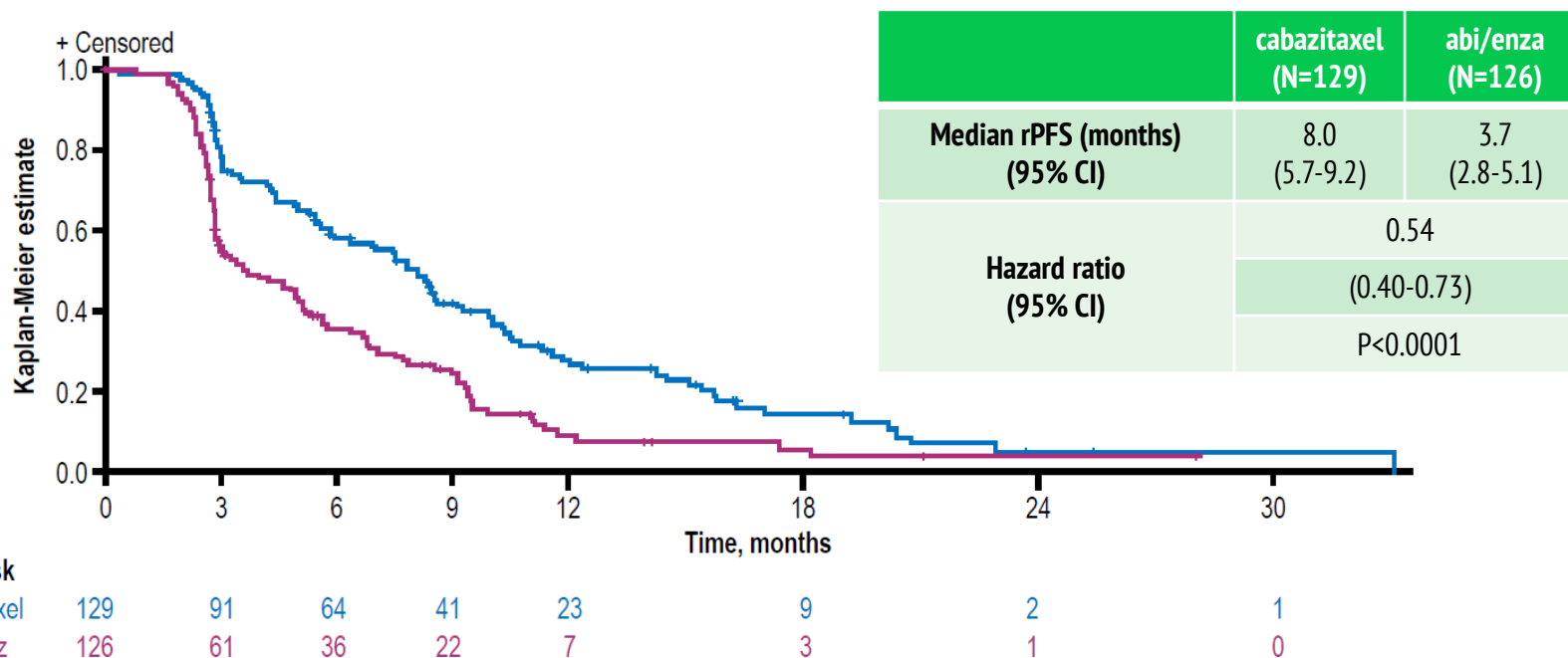


Stratification factors:

- ECOG PS (0/1 vs 2)
- Time to progression on prior alternative ARTA (0–6 vs >6–12 months)
- Timing of ARTA (before vs after docetaxel)

CARD STUDY – PRIMARY ENDPOINT

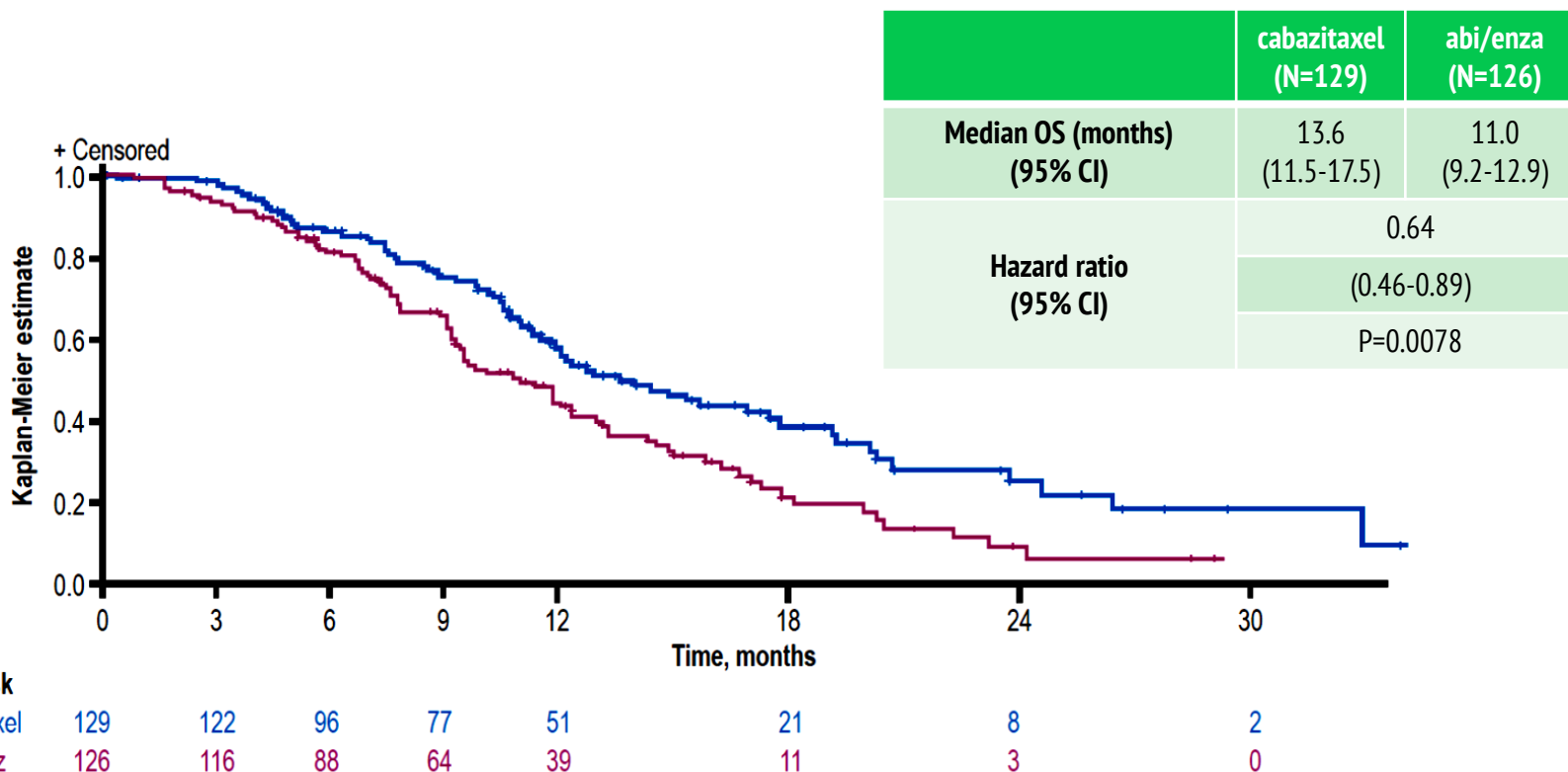
RADIOGRAPHIC PFS (INVESTIGATOR ASSESSED)



- rPFS benefit observed for cabazitaxel compared to abi/enza was consistent across key subgroups, especially timing of ART with respect to receipt of docetaxel, as well as time from ART initiation to progression

CARD STUDY – SECONDARY ENDPOINT

OVERALL SURVIVAL

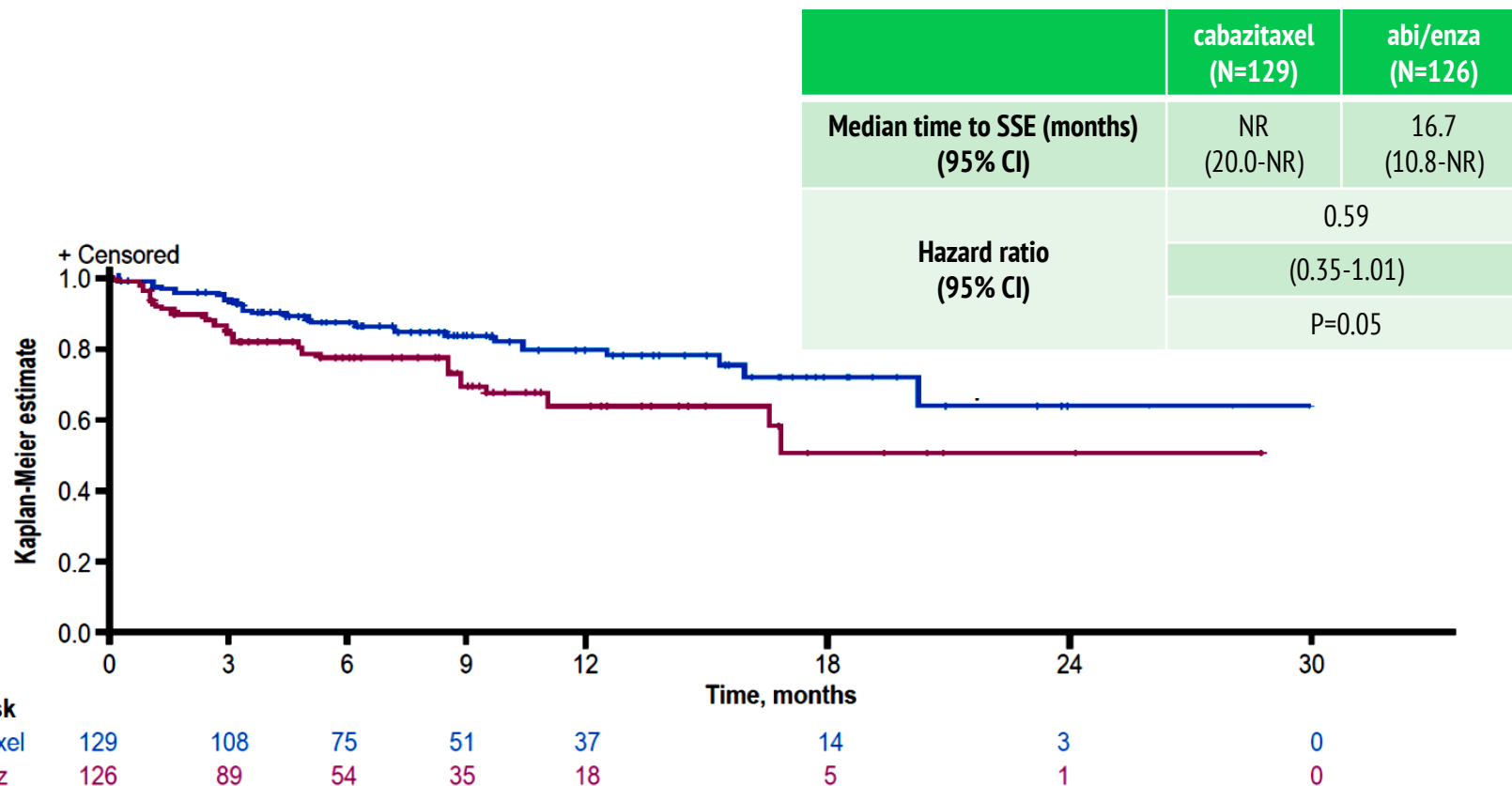


Abi, abiraterone; CI, confidence interval; enza, enzalutamide

de Wit R, et al. ESMO 2019 Abstract #LBA13; de Wit R, et al; NEJM 2019; DOI: 10.1056/NEJMoa1911206.

CARD STUDY – SECONDARY ENDPOINT

TIME TO SKELETAL EVENT



The median time to the first symptomatic skeletal event could not be evaluated (NE) in the cabazitaxel group. Tick marks indicate censored data.

CARD: SAFETY

MAIN GRADE ≥ 3 ADVERSE EVENTS*

| Adverse events, n (%) | Cabazitaxel (N=126) | Abiraterone or enzalutamide (N=124) |
|---------------------------------------|---------------------|-------------------------------------|
| Infections | 10 (7.9) | 9 (7.3) |
| Asthemia/fatigue | 5 (4.0) | 3 (2.4) |
| Diarrhea | 4 (3.2) | 0 |
| Peripheral neuropathy | 4 (3.2) | 0 |
| Renal disorders** | 4 (3.2) | 10 (8.1) |
| Febrile neutropenia | 4 (3.2) | 0 |
| Spinal cord and nerve root disorders† | 3 (2.4) | 5 (4.0) |
| Musculoskeletal pain/discomfort‡ | 2 (1.6) | 7 (5.6) |
| Cardiac disorders | 1 (0.8) | 6 (4.8) |

*In $\geq 3\%$ of patients in either treatment arm; **Includes acute kidney injury, renal failure and impairment, hydronephrosis, pyelocaliectasis; †Includes sciatica, radiculopathy, spinal cord compression; ‡Includes back pain, flank pain, musculoskeletal discomfort and pain, neck pain, pain in extremities.

- 98.4% patients in the cabazitaxel group vs. 94.4% in the abiraterone/enzalutamide group had an adverse event of any grade
- The incidence of serious adverse events of any grade was similar in the cabazitaxel group (38.9%) and the androgen-signaling –targeted inhibitor group (38.7%)

- **The CARD trial addresses an unmet clinical need regarding sequencing of 3rd line treatments for progressive mCRPC patients**
- The current treatment landscape should be for fit patients to receive docetaxel and abiraterone or enzalutamide at some stage (+/- radium-223)
- The results of the **CARD trial** are in agreement with those of previous studies that have **shown poor outcomes with a second androgen signaling-targeted inhibitor**¹⁻⁵
- Based on information presented in the CARD trial, **cabazitaxel is a new standard of care for 3rd line patients with progressive disease on prior novel androgen signaling inhibitors therapy ≤12 months of initiating therapy, and with prior docetaxel therapy**

mCRPC, metastatic castration resistant prostate cancer

1. Attard G, et al. JCO. 2018;36(25):2639-46; 2. Khalaf D, et al. JCO. 2018;36(15):5015; 3. Smith MR, et al. Eur Urol. 2017;72(1):10-13; 4. Zhang T, et al. Clin Genitoruin Cancer. 2015;13:392-9; 5. Azad AA, et al. Eur Urol. 2015;67:23-9; 6. de Wit R, et al. ESMO 2019 Abstract #LBA13; 7. de Wit R, et al; NEJM 2019: DOI: 10.1056/NEJMoa1911206.

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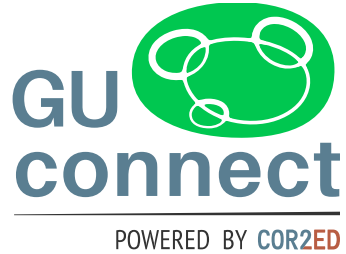
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