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Increased incidence rates of positive blood cultures shortly after chemotherapy treatment initiation among individuals treated for solid malignant tumours

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BACKGROUND

- Infections are common among those diagnosed with cancer
  - Dysfunctional immune system following a malignant disease
  - Radiotherapy and chemotherapy disrupt mucosal surfaces which increase risk of infection
  - Protection from skin is breeched with surgery and medical devices
  - Tumour itself can obstruct normal bodily functions leading to infection
- Burden of infections for treated cancer patients has not been elucidated

OBJECTIVES

- Estimate incidence rate of a positive blood culture (PBC) among individuals treated for solid malignant tumours with chemotherapy and/or radiotherapy
- Estimate the proportion who died within 30-days of a PBC

METHODS

- Patients treated for solid malignant tumours with radiotherapy (RT) and/or chemotherapy (C) at the Department of Oncology at Rigshospitalet between 01/1/2010 to 31/12/2016 were included
- Individuals were followed from treatment initiation to the earliest of one year after treatment initiation, new cancer treatment , end of follow-up or death
- Incidence rates (IR) of PBC per 1000 person-years follow-up were calculated
- We examined the proportion who died within 30-days of PBC
- We investigated the top 5 pathogens identified trough PBC

RESULTS

- 12,433 individuals were included; 3,582 receiving RT only; 6,349 receiving C only; 2,502 receiving RT & C
- 554 PBC episodes were identified among 429 individuals (3%).
- IR of PBC was highest in the first 3 months post treatment
- IR in month 0-3 were more than two fold higher among those receiving C (IR = 103.8 (88.7, 121.5) per 1000 PYFU) or combined RT & C (88.8 (67.3, 117.2) compared to only RT (IR = 31.8 (21.8, 46.3))
- Proportion of deaths within 30-days of PBC was similar between treatments
- *E. Coli* was the most common pathogen, there were 11 cases (2%) of Candida

Table 1: Baseline characteristics

	RT	C	RT & C	Total
	n = 3582	n = 6349	n = 2502	n = 12433
Total Person-Years follow-up	2921	3746	1515	8182
Female - n (%)	2178 (61%)	3305 (52%)	1057 (42%)	6540 (53%)
age (median (IQR))	64 (54, 71)	64 (54, 72)	62 (54, 68)	64 (54, 71)
diagnosis- n (%)				
Breast	1480 (57%)	1101 (42%)	11 (0%)	2,592
Lung	229 (12%)	1164 (62%)	491 (26%)	1,884
Colorectal	85 (6%)	1137 (82%)	162 (12%)	1,384
Stomach	11 (1%)	1169 (95%)	51 (4%)	1,231
Head & Neck	681 (55%)	18 (1%)	533 (43%)	1,232
Female Genital	131 (11%)	716 (62%)	302 (26%)	1,149
CNS	354 (42%)	70 (8%)	422 (50%)	846
Male Genital	273 (36%)	431 (57%)	54 (7%)	758
Esophogael	40 (10%)	18 (4%)	362 (86%)	420
Bladder	58 (19%)	228 (75%)	17 (6%)	303
Other	240 (38%)	297 (47%)	97 (15%)	634

Figure 1: Time from treatment initiation to first PBC

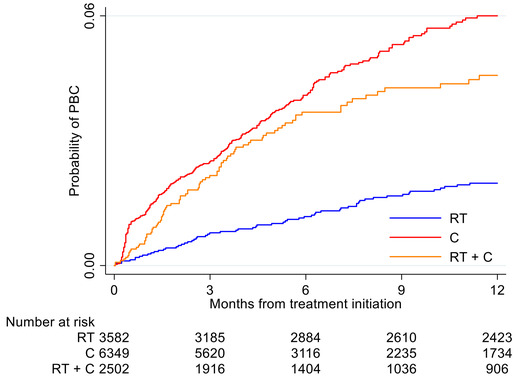

Figure 2: Incidence rates of PBC and 30-day death rates

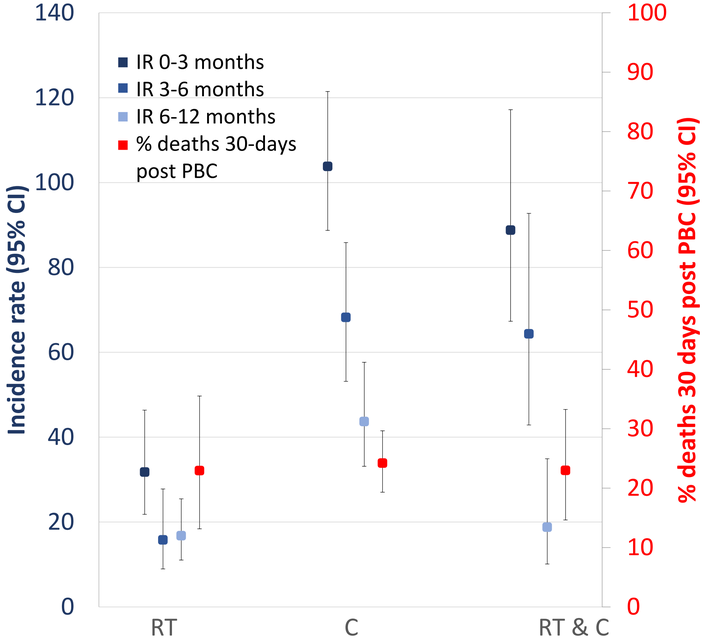

Table 2: Top five pathogens identified in PBC

Result	RT	C	RT + C	Total
Individuals with ≥1 PBC	61 (2%)	281 (4%)	87 (3%)	429 (3%)
Escherichia coli	15 (19%)	93 (26%)	27 (24%)	135 (24%)
Staphylococcus aureus	15 (19%)	49 (14%)	19 (17%)	83 (15%)
Klebsiella pneumoniae	3 (4%)	46 (13%)	12 (10%)	61 (11%)
Enterococcus faecium	8 (10%)	20 (6%)	6 (5%)	34 (6%)
Pseudomonas aeruginosa	4 (5%)	19 (5%)	3 (3%)	26 (5%)

CONCLUSIONS

- Incidence rate of PBC changes over time after treatment initiation
- PBCs are most frequent within 0-3 months after treatment
- PBCs are mainly a problem upon chemotherapy, not upon radiation
- Mortality is high for patients with PBCs
- Identification of risk factors for PBC are warranted to provide prophylactic measures

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