Retrospective study to identify factors in fast, medium and slow progressing osteoarthritis patient in Germany

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Introduction

- Osteoarthritis (OA) is a common disorder whose treatment focuses mainly on pain management and surgery in the final stages of the disease. Research demonstrates that some patients have faster disease progression and earlier surgery. The objective of this study is to identify patient characteristics implying faster disease progression to support optimal disease management.

Method

- Data were extracted from German Disease Analyzer (DA) electronic medical records for a 12 years period (2004-2016) . There were ~50k eligible patients with confirmed OA diagnosis (defined by ICD10 codes M15, M16, M17, M18 and M19).

- Descriptive statistics and clustering methods were applied (K-means). The analyses include a 12 year period (2004-2016) of electronic medical records. Patients were divided into groups based on the time of surgery from diagnosis (previous surgery, 0-2 years, 2-5 years, over 5 years and no surgery). The underlying data included different variables such as diagnosis and treatment (drug) patterns, laboratory tests and demographic information for osteoarthritis patients.

Results

- The demographics in table 1 show a similar distribution on the gender by cohort (mostly female) but there are differences in age, obesity and comorbidity status.

Variable	Patient counts	Age (mean +/- s.d)	Distinct Diag (mean +/- s.d)	Gender	Obesity_indicator
Previous surgery	1292	71.4+/-11.6	45+/-23.6	70% F	20%
0-2 years	2114	67.6+/-11.1	44.1+/-23	60% F	20%
2-5 years	2068	65.5+/-11.3	48.4+/-23.7	70% F	30%
Over 5 years	3461	61.5+/-10.5	58.4+/-25.2	70% F	30%
Not surgery	38770	64.7+/-13.8	42.9+/-22.2	60% F	20%

Table 1. Patient demographics

Obesity indicator is dependent on doctors providing the diagnosis. This indicator is likely to be underestimating the real figure

- OA treatments were grouped into broader categories. Figure 2 represents the mean number of prescriptions (RX) for each treatment category from the time of diagnosis. The mean number of treatments tends to increase in the groups that have later surgery.

- In figure 3 the OA patient journey illustrates that the treatment initiation of opioids starts significantly earlier in the faster progressor groups (surgery within 2 years and within 2-5 years). Interestingly the fastest progressor group have surgery prior to opioid initiation therapy . This might imply an unmet need (unresolved pain after surgery) or further joins affected.

- Laboratory tests were collected in all groups. T-tests show the results that were significantly different than the average for each group (figure 4).

- Our data show that the top differentiators for early surgery are: high weight, high triglycerides and high gamma GT values, older age (>67) and earlier initiation of opioids treatment (see figure 5).

Conclusion

The evidence suggests that some patients' attributes might predict faster progressing disease. This should be explored further with machine learning approaches. There is evidence of a high unmet need in the faster progressing population: opioid administration after surgery might imply unresolved pain (10-30% of the patients do not improve after surgery) [3]. Malfunctioning joint replacement could also be an explanation.

Results

AVERAGE NUMBER OF PRESCRIPTIONS IN EACH GROUP

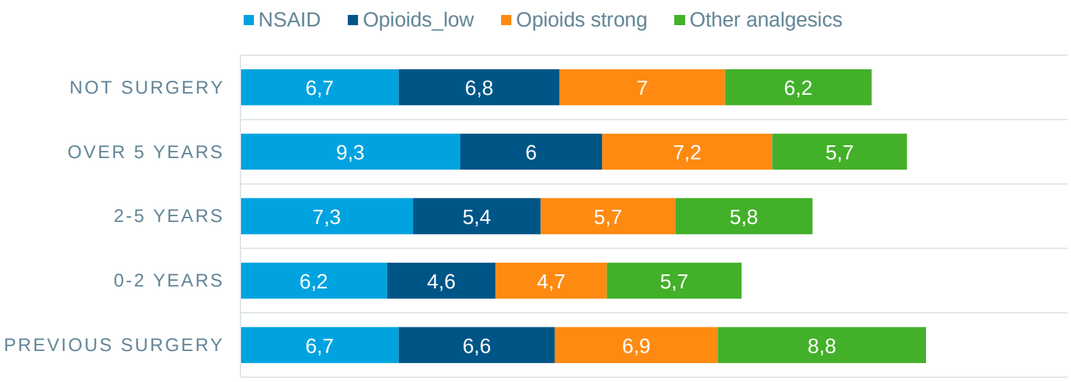
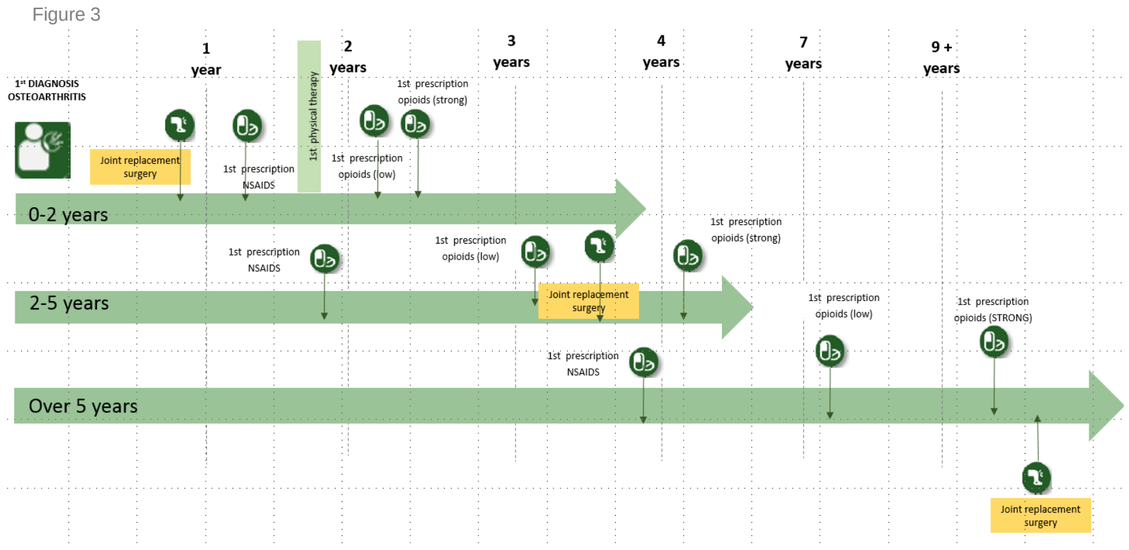


Figure 2 – average number of prescriptions
Opioids low example: codeine or tramadol. Opioids strong example: morphine or fentanyl.

TREATMENT INITIATION FROM TIME OF DIAGNOSIS

Figure 3



LABORATORY TESTS

Previous surgery	0-2 years	2-5 years	Over 5 years	Not surgery
Gamma GT	Gamma GT	ery_mcv	ery_mch	Haem_glob
Weight	Weight	Weight		Creatinine
Triglyceride	Height	Triglyceride		
	Triglyceride			

Table 4– top differentiators for early group

TOP DIFFERENTIATORS FOR EARLY SURGERY

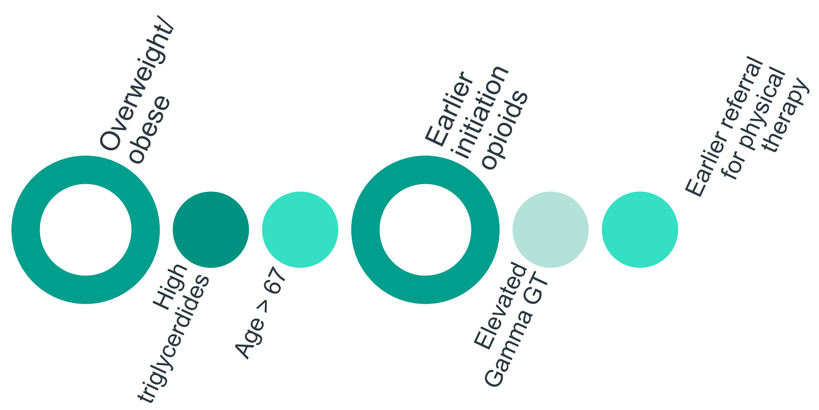


Figure 5– top differentiators for early surgery

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ISPOR 19th Annual European Congress, 10-14 November 2018 in Barcelona, Spain.