TRAVAIL DE MAÎTRISE

CLINICAL PATHWAY FOR RECTAL CANCER

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Introduction

Colorectal cancer is the third most frequent cancer for men and second most frequent for women in Switzerland (1). Rectal cancer requires a multidisciplinary treatment involving many specialists such as surgeons, oncologists, gastroenterologists, radio-oncologists, pathologists and general practitioners (GP). Their cooperation is crucial and has a great impact on the patient's clinical pathway and its outcomes.

But what does « clinical pathway » mean? It means all the different appointments, examinations and treatments a patient suffering from rectal cancer will face during his journey and follow-up. Indeed, a person suffering of rectal cancer will see different physicians and und will undergo many different examinations and treatments. Initially, most patients consult their GPs with symptoms and then will be referred to a specialist for diagnosis and treatment. The GP's role is very important as they refer the patient to the specialist and initiate medical care. For example, in Israel, it has been described (2-3) that 52% of the patients had a diagnosis delay of up to 6 weeks or more. The responsibility for these delays could be attributed to a practitioners-related component in 47% and for 54% to a patient-component such as lack of education. However, administrative factors have been responsible for 26% of delay involving more than one speciality/person in 27%.

With this GPs-component, the UK (4) government had introduced since 2000 a two-weeks rule for colonic and rectal cancer. This rule says that all the patients with a suspected rectal or colonic cancer have to be referred to a specialist within two weeks in order to get their colonoscopy and diagnosis. Indeed, prospective studies (4) have demonstrated that this 2 weeks rule allowed patients to reduce the wait to see a specialist but unfortunately didn't affect the overall wait to treatment start or staging of the disease. The delay between the diagnosis and treatment was still cited as a significant problem in the medical care of the patients. Nevertheless, this 2 weeks rule didn't show any impact on survival as it only refers to a small proportion of the patient's pathway. For these reasons, the entire pathway from symptoms to diagnosis and to treatment has to be carefully assessed.

Jensen et al. from Denmark (5) observed in a study in 2014 on colorectal cancers that implementing a « cancer patient pathway », in accordance with the national guidelines, could significantly decrease the time delays from referral to endoscopy and oncological treatment and also increased 60-month overall survival. This study proved that improvement of the clinical pathway can affect survival.

The aim of the herein presented study were to evaluate the pathways of patients with rectal cancer treated at the University Hospital Lausanne (CHUV), to identify points of improvement and to define a multidisciplinary clinical pathway to optimize and standardize medical care. Where can the medical care be more efficient? What can be improved?

Material and Methods

All patients operated for rectal cancer from 2012 to 2016 at the CHUV were reviewed retrospectively. The clinical pathway which included appointments, examinations, pre- and postoperative treatment including follow-up appointments were reviewed for each patient by chart review.
The study was approved by the ethical committee (number 2016-01663). For the purpose of this study, patients were not contacted.

Results

Patient demographics

123 patients were included, 49 women and 74 men with a mean age of 68 years for men and 64 for women (table 1).

Table 1. Distribution of patients by year.

	2012	2013	2014	2015	2016	Total	Mean age
(N)	17	16	32	31	27	123	
Males	10	9	24	15	16	60.2%	68 ± 10.7
Female	7	7	8	16	11	39.8%	64 ± 17.3

From these 123 patients, 74 patients (60%) were initially referred by external physicians to the CHUV. 72% of them have been addressed to the department of visceral surgery, 15% to gastroenterology and 14% to oncology. All but one patient were adenocarcinoma. Tumour's locations are shown in table 2 and figure 1. 96.7% of the patients underwent a curative treatment.

Table 2. Tumour locations.

Classification	Location of tumor	%
Lower third	0-5 cm	39%
Middle third	6-10 cm	41.5%
Upper third	11-15 cm	19.5%

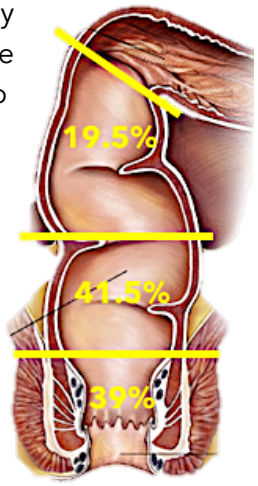


Figure 1. Tumour's location.

Clinical pathway to tumor boards

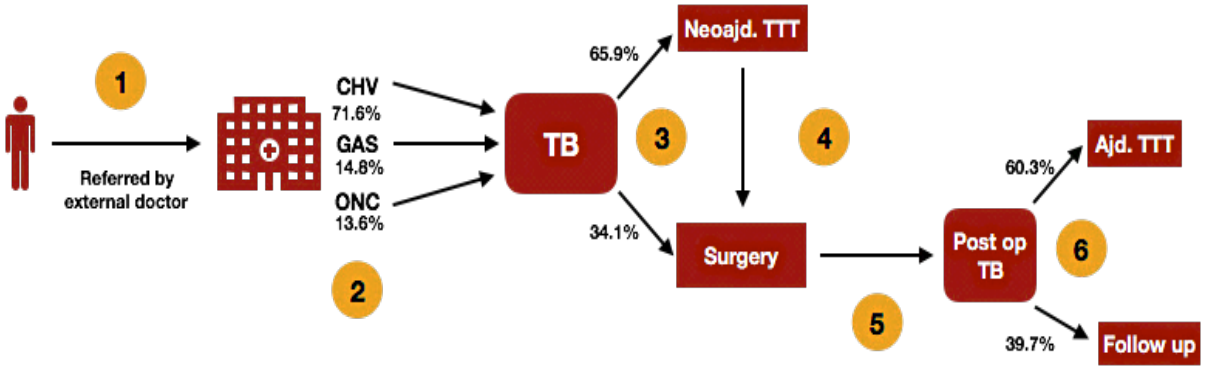
To stage the tumours, patients will undergo an imaging assessment, which can include many different exams such as MRI, CT, endosonography and PET-CT. The most common exams are MRI and CT and were undertaken in 91.1% and 85.4% of the patients, respectively.

Once the staging is done, patients are presented at the multidisciplinary tumor board (TB) and the decisions of a neoadjuvant treatment or immediate surgery is taken. 65.9% of patients underwent neoadjuvant therapy. The others underwent directly surgery .
After surgery the second TB discussed pathology and adjuvant treatment. 60.3% of patients underwent adjuvant treatment (94.5% chemotherapy). Only 5.5% had radiotherapy and chemotherapy.

Analysis by stages and by years

Now that the population has been introduced let's have a closer look at their clinical pathways and try to compare them across the years. During their way to possible cure, the patient faced many exams, treatment and appointment. To simplify, the clinical pathway has been divided into stages as shown in figure 2 and table 3. First of all, let's assess how much time each step of the pathway takes. It will give us a more precise idea of how efficient the patients are taken care of. Therefore, each step will include different time intervals.

Figure 2. The different stages of the clinical pathway.



Stage 1 referral : Referral from diagnosis to the CHUV. (CHV for visceral surgery, GAS for gastroenterology and ONC for oncology).
Stage 2 work up : Work up of the patient until first tumour board presentation (TB).
Stage 3 tumour board : First therapeutic attitude chosen after the tumour board with the percentage of with the two possible options : neoajduvant treatment (neoajd TTT) or surgery.
Stage 4 restaging : Restaging and 2nd tumour board decision.
Stage 5 Post-op TB: Time from surgery to the post-operative tumour board (Post op TB).
Stage 6 adjuvant treatment : Time to adjuvant treatment (Ajd TTT).

Table 3. Mean time (weeks) for each stage by years.

Stages	2012	2013	2014	2015	2016	Overall
1	6.1	3.6	5.8	3.4	4.1	4.6
2	2.6	1.6	-0.9	1.3	2.2	1.1
3	1.8	6.2	3.3	2.5	0.7	2.6
neo/op	none	3.2	2.5	3	2.1	3
4	7	7.8	10	9.7	11.8	9
5	1.1	2	1.5	1.3	1.5	4.2
6	none	4.3	5.6	4.9	4.4	4.9

Stage 1 : Referral from diagnosis to the CHUV

The first stage represents the time between the diagnosis and the first CHUV contact. There are two time intervals T_1 and T_2.

- T_1 : time between the diagnosis (histology proven) and the addressing letter to the CHUV.
- T_2 : time between the addressing letter and the first CHUV contact.

Figure 3. Stage 1: Time Interval.

These time intervals were calculated according to the found dates on the consultation reports and the letters from the GPs. All the times intervals for this stage are expressed in weeks.

Table 4. Results from the first step of the rectal clinical pathway in weeks.

STEP 1		2012	2013	2014	2015	2016	p-value
T1	Mean ± SD	4.8 ± 9.4	0.3 ± 2.7	3.8 ± 7.7	3.1 ± 4.3	2.5 ± 5.3	0.38
	Missing data	76%	44%	66%	68%	74%	
T2	Mean ± SD	2 ± 1.1	1.5 ± 1.4	2 ± 3.9	2.6 ± 3.1	2.9 ± 5.3	0.08
	Missing data	35%	37%	41%	48%	52%	

The overall T1 time was 2.8 weeks (SD±5.7) weeks and T2 was 2.2 weeks (SD±3.4). As table 4 shows us, a lack of documentation was faced which can be noticed by the poor number of addressing letter per year archived in the CHUV database. Therefore, it is hard to interpret and assess these results. Then, there are a lot of variations in the values of T_1. Nevertheless it can still be remarked that the mean/median times are often above two weeks, which is worse compared to the UK with their 2 weeks rule.

T_2 representing the time to reach a contact with the CHUV (Oncologic or CHV), has a trend to increase since 2013. Indeed it grossly varies from one and a half week in 2013 to 3 weeks in 2016.

Stage 2 : Work up of the patient until first tumour board presentation (TB)

The second stage describes the time taken by the CHUV to present the patients to their first tumour board. Indeed, it will tell us how fast the CHUV makes decision on these patients. No distinction was made between their first clinic of contact. The first CHUV contact to their first tumour board was the reference for this time interval (T_3).

Table 5. Time the CHUV takes to present its patients to their first tumor board in weeks.

STEP 2		2012	2013	2014	2015	2016	p-value
T3	Mean ± SD	3.4 ± 3.9	1.4 ± 1.8	0.01 ± 4.07	0.6 ± 2.4	2.5 ± 5.5	0.34
	missing data %	90%	64%	7%	13%	0%	

According to the results of table 5, a trend to decrease can be observed in the time to present the patient to the TB. From 2014, there are more data and an improvement in the median time to take a first decision at the tumour board can be noticed. 2015 seems to best represent the T_3 as there is a good number of data and a small standard deviation with good mean and median times. Thus, the CHUV needs around a week to decide the therapeutic attitude they want to take towards its patients with rectal cancer.

Stage 3 : First therapeutic attitude chosen after the TB with the two possible options : neoajduvant treatment (neoajd TTT) or surgery

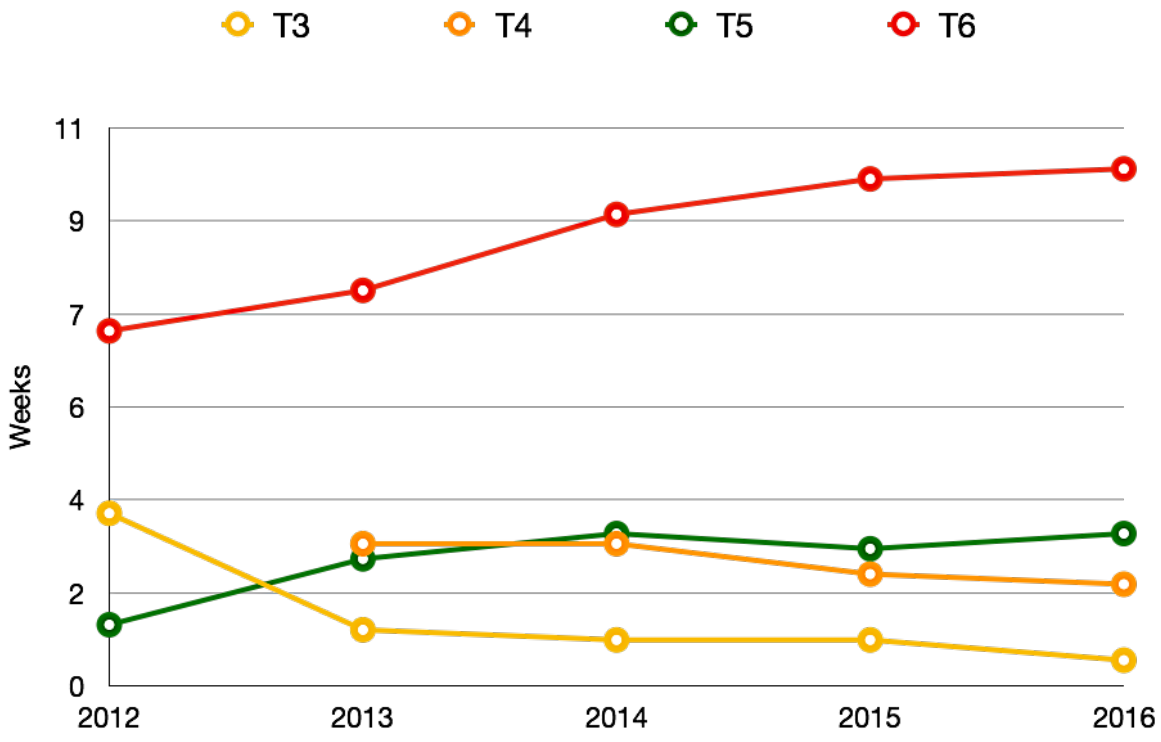
The third step concerns the decision of the TB whether to go to surgery (T_4) or to process with a neoadjuvant treatment (neoadj TTT;T_5.). As a matter of fact, it represents the time intervals to undertake a first action against the cancer when an attitude is chosen (summarized in table 6).

Table 6. Time to start surgery or neoadjuvant treatment from tumour board decision in weeks.

STEP 3		2012	2013	2014	2015	2016	p-values
T4	Mean ± SD		2.8 ± 1.9	2.7 ± 1.2	3 ± 2.4	2.1 ± 0.8	0.34
	missing data %		50%	25%	20%	0%	
T5	Mean ± SD	1.2 ± 0.3	2.8 ± 1	5.1 ± 6.7	2.9 ± 3.1	0.6 ± 6.2	0.58
	missing data %	89%	62%	14%	25%	13%	

Even though the median times for T_4 and T_5 are pretty close, it is slightly better for the surgery arm. Therefore, it can approximately be said that the times to undergo surgery or to start neoadjuvant treatment are quite similar and vary between 2 and 3 weeks. Figure 4 shows us the trends of T_3,T_4, T_5, and T_6 which will be introduce in the next stage.

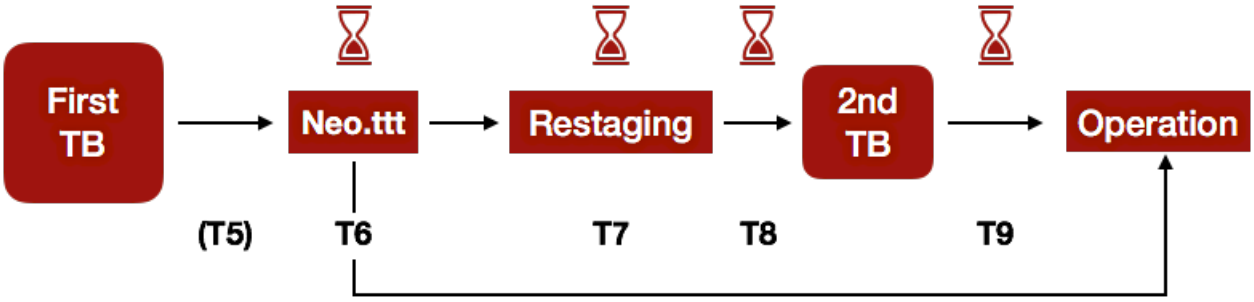
Figure 4. The evolutions of T_3,T_4, T_5, and T_6 (median times).



Stage 4 : The restaging and 2nd TB decision

From this point, the pool of patients splits into two groups : one receiving a treatment before surgery and one going directly to the operation. It then brings us to a new step, which only concerns the patients who undergo a neoadjuvant treatment.
By analysing this step, the aim was to assess how much time was taken to be operated from the end of the neoadjuvant treatment. On figure 1, this step is represented as the fourth step. Figure 5 gives us a detailed view of the fourth step with the different time intervals that will be discussed.

Figure 5. Detailed view of the fourth step.



The time intervals represented on figure 5 are :

- T_6 represent the time from the end of the neoadjuvant treatment to surgery.
- T_7 is the time taken from the end of the neoadjuvant treatment to the end of the restaging when any occurs.
- T_8 is the time from the last restaging exam to the 2nd tumour board.
- T_9 represent the time interval to the operation from the 2nd tumour board.

Table 7 is hard to interpret for T_8 and T_9 because a lack of data occurred concerning these time intervals. Nevertheless, T_9 seems to be the time intervals that last the longest beside T_6. However, concerning T_6, it can be noted that more time has been taken since 2012 to go from the neoadjuvant treatment to the surgery. Nevertheless, T_7 seems to remain steady through the years.
T6 voluntarerly increased during the study period as the TB decided to increase the interval to surgery if the tumor responded to neoadj TTT. This is in accordance with the current literature.

Table 7. Time taken to restage and present the patient to a 2nd tumour board after a neoadjuant treatment in weeks.

STEP 4		2012	2013	2014	2015	2016	p-values
T6	Mean ± SD	6.9 ± 2.7	7.9 ± 3.3	8.9 ± 3.5	10.1 ± 3.5	10.4 ± 5.4	0.27
	missing data %	28%	25%	0%	0%	6%	
T7	Mean ± SD	0.5 ± 0.9	0.9 ± 1.2	1.1 ± 0.6	1.1 ± 0.4	1.3 ± 0.9	0.019
	missing data %	0%	0%	5%	0%	0%	
T8	Mean ± SD		0.1	0.8 ± 0.4	0.5 ± 0.4	1.7 ± 1.5	0.21
	missing data %		89%	80%	25%	64%	
T9	Mean ± SD		4.1	4 ± 1.8	5.6 ± 2.3	3.3 ± 2.4	0.35
	N		89%	80%	25%	64%	

Stage 5 : Time from surgery to the post-operative tumour board

Now that all the patients have been operated, the next step is histopathology and the postoperative tumour board decision. Indeed, some of the patients will require radiotherapy, chemotherapy or both.
T_{10} and T_{11} represent the time between surgery and histopathology and the time between surgery and postoperative tumour board (table 8). This is what constitutes the fifth step.

Table 8. Times between postoperative histology and tumour board in days.

STEP 5		2012	2013	2014	2015	2016	p-values
T10 (days)	Mean ± SD	6 ± 2.6	3.8 ± 11.4	19.9 ± 31.6	14.1 ± 12.9	12 ± 11.4	0.46
	Missing data %	47%	12%	26%	6%	7%	
T11 (days)	Mean ± SD	15 ± 9.9	14.4 ± 5.5	88.3 ± 208.7	8.8 ± 5.5	10.8 ± 5.7	0.33
	Missing data %	88%	69%	62%	55%	41%	

The median times of T_{10} in 2014 and 2015, where the most data has is available, reached the two highest values of 9.5 and 9 days. It might best represent the time really taken to have the histology results.
As there were only two cases in 2012 concerning T_{11}, the kinetics of the median times were only analysed from 2013 to 2016. What can be noticed is that the median time was above 10 days back in 2013 but has decreased in 2014 and passed the cut off 10 days in 2015. The value could have been maintained under 10 days in 2016 as well.

Stage 6: Time to adjuvant treatment (ajd TTT)

T_{12} represents the time from postoperative TB to begin of adj TTT (table 9).
Unfortunately, no data was available for 2012. Therefor let's look at T_{12} from 2013. By the poor number of data in every year it is pretty hard to draw conclusions.
In 2015, where the most data has been collected, the mean time to start adjuvant therapy from the tumour board was 5.4 weeks, which is within the 6 weeks recommended. Nevertheless a trend to decrease can be observed in this time since 2014 even though there was a lack of data.

Table 9. Time from postoperative tumour board to start of the adjuvant treatment.

STEP 6		2012	2013	2014	2015	2016
T12	N ± SD		4.3 ± 2.8	6 ± 0.9	5.4 ± 2.1	3.4 ± 2.1
	Missing data %		68%	84%	42%	67%

Surgical parameters

Table 10 sums up all the different surgical parameters that were assessed.
The most common operation undertaken was a low anterior resection. The complication rate seems to be very inconstant and so is the rate of reoperation during the same hospitalisation. However, the time from surgery to protective ileostomy closure has decreased since 2013 to reach a minimum of 1.9 month in 2016.

Post-operative follow-up

At the end of the adjuvant treatment, the patients are supposed to be done with their treatment. From this point on, they should start their follow-up over the next 5 years. Therefore, attention should be paid on how the patients are followed (table 11). The main focus was on the number of patients followed at CHUV and how many patients had their radiologic, endoscopic and clinical exam at the right time according to the guidelines. To get the theoretical dates of follow up, the operation dates were the referred dates. On the 123 theoretical follow ups, 60 were undertaken at CHUV, 49 were external and 14 of them were lost. However, it was decided to stay focused on the 60 that were managed by the CHUV.

Table 10. Surgery parameters (time in months).

		2012	2013	2014	2015	2016
Op	N	17	16	32	31	23
	LAR	94.1%	81.3%	93.8%	67.7%	85.2%
	HAR	0	0	3.1%	19.4%	3.7%
	APR	5.9%	18.7%	3.1%	12.9%	11.1%
Comp	N	9	6	17	12	13
	Rate	52.9%	37.5%	53.1%	38.7%	48.1%
Reop same hosp	N	6	1	5	4	7
	Rate	35.3%	6.3%	15.6%	12.9%	25.9%
Time to ileostmy closure	Mean	5.9	4.3	6.2	5.3	2.5
	N	13	11	29	23	20
	Standard deviation	4.2	2.5	7.4	4.8	1.6
	Median	5	5.3	4.6	2.4	1.9

Table 11. The follow-up.

Follow up

Months post OP date	TOTAL follow-up	lost/dead/not done yet	CHUV theoretical	Clinical exam	Radiology CT/ MRI/US	Endoscopy	CEA	Complete according to Guidelines	None/unknown	EXTERNAL theorical
6	109	0	60	43	23	21	43	10(17%)	11	49
12	109	0	60	42	54	32	none	17(28%)	5	49
18	95	14	51	32	28	14	none	8(16%)	11	44
24	85	24	47	30	34	14	none	7(15%)	10	38
36	57	52	32	20	19	none	none	18(56%)	11	25
48	28	71	17	12	10	none	9	7(41%)	4	11
60	13	96	10	6	6	none	4	2(20%)	2	3

(Percentage of follow-ups complete)

Even at the beginning of the follow up, it can be remarked that patients are not correctly taken care of. As a matter of fact, only a few of the patients followed at CHUV got their follow-up complete each year. A little bit more than half of the patients got their clinical and radiologic exams done correctly according to the recommendations, not so for endoscopic exams.

Discussion

This study confirmed that the clinical pathway of patients with rectal cancer has a great variability and that, unfortunately, many data were missing. However, it gives us an insight on various steps that need improvement to make the pathway more time efficient and to avoid unnecessary delay. In addition, follow-up needs to be more coordinated and improved.

Now that all the results have been presented and that we previously described all the stages defined in figure 1, it might be interesting to assesse the evolution of each stage through the years. Table 12 sums up all times of each stage.

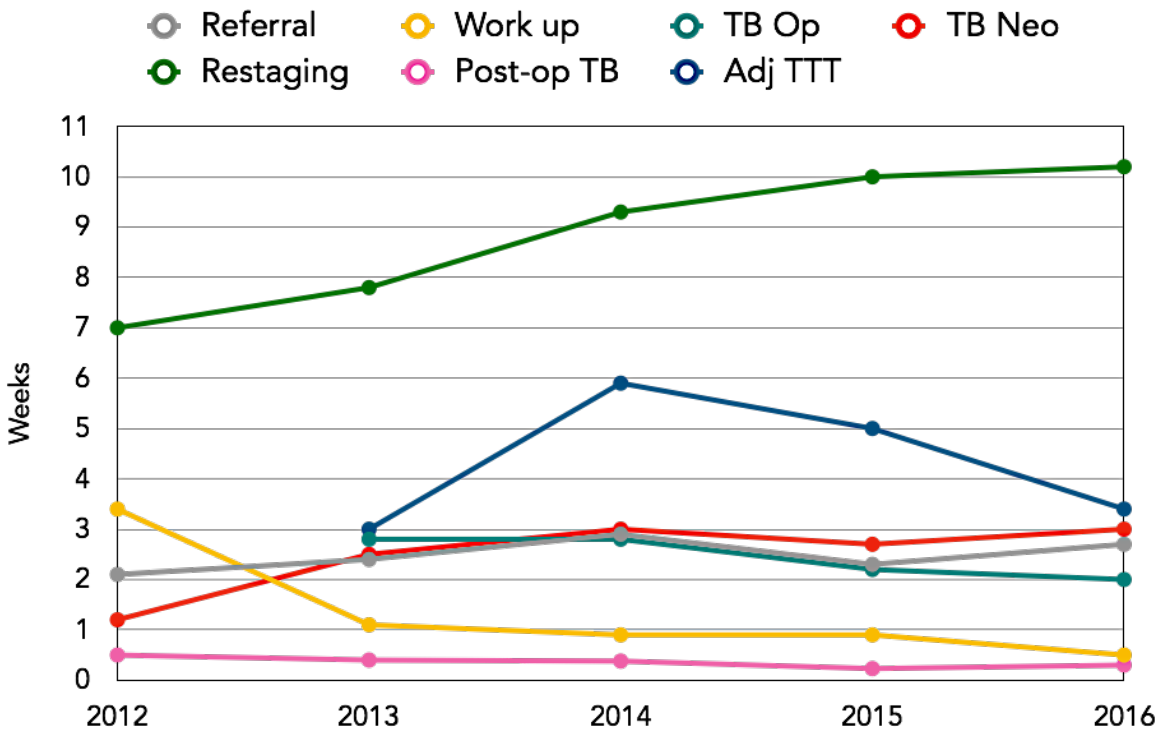
- Step 1 : diagnosis to the first CHUV contact
- Step 2 : first CHUV contact to the tumour board
- Step 3 : tumour board to operation or neo-adjuvant treatment
- Step 4 : end of neoadjuvant treatment to surgery
- Step 5 : surgery to postoperative tumour board
- Step 6 : postoperative tumour board to adjuvant treatment.

Table 12. The stages in weeks.

STEPS		2012	2013	2014	2015	2016	p-values	overall
1	Mean ± SD	6.1 ± 7.6	3.6 ± 4.2	5.8 ± 5.8	3.4 ± 3	4.1 ± 4.2	0.238	4.6 ± 5.1
2	Mean ± SD	3.7 ± 4.2	1.4 ± 1.8	-0.5 ± 4.2	-0.7 ± 5.8	-1.6 ± 14.2	0.342	1.1 ± 4.1
3	Mean ± SD (Op)	no data	2.8 ± 1.9	2.7 ± 1.2	3 ± 2.4	2.1 ± 0.8	0.586	2.6 ± 1.7
	Mean ± SD (Neo)	1.2 ± 0.3	2.8 ± 1	5.1 ± 6.7	2.9 ± 3.1	0.6 ± 6.2	0.189	3 ± 5.5
4	Mean ± SD	6.9 ± 2.7	7.9 ± 3.3	8.9 ± 3.5	10.1 ± 3.5	10.4 ± 5.4	0.268	9 ± 3.9
5	Mean ± SD	2.1 ± 1.4	2 ± 0.8	12.6 ± 29.8	1.3 ± 0.8	1.5 ± 0.8	0.459	4.2 ± 15.1
6	Mean ± SD	no data	4.3 ± 2.8	6 ± 0.9	5.4 ± 2.1	3.4 ± 2.1	0.814	4.9 ± 2.2

It is pretty hard to see any trend in any stages. However, we can observe for the second stages that from 2014 on the patients were more often presented at the tumour board even though they hadn't been seen yet any CHUV physician. This could be interpreted as a sign of improvement. As described above, the relative increase in time regarding the fourth step (the interval from neo-adjuvant treatment to surgery) is voluntary. By delaying surgery the percentage of pathological complete response can be increased (10-11)

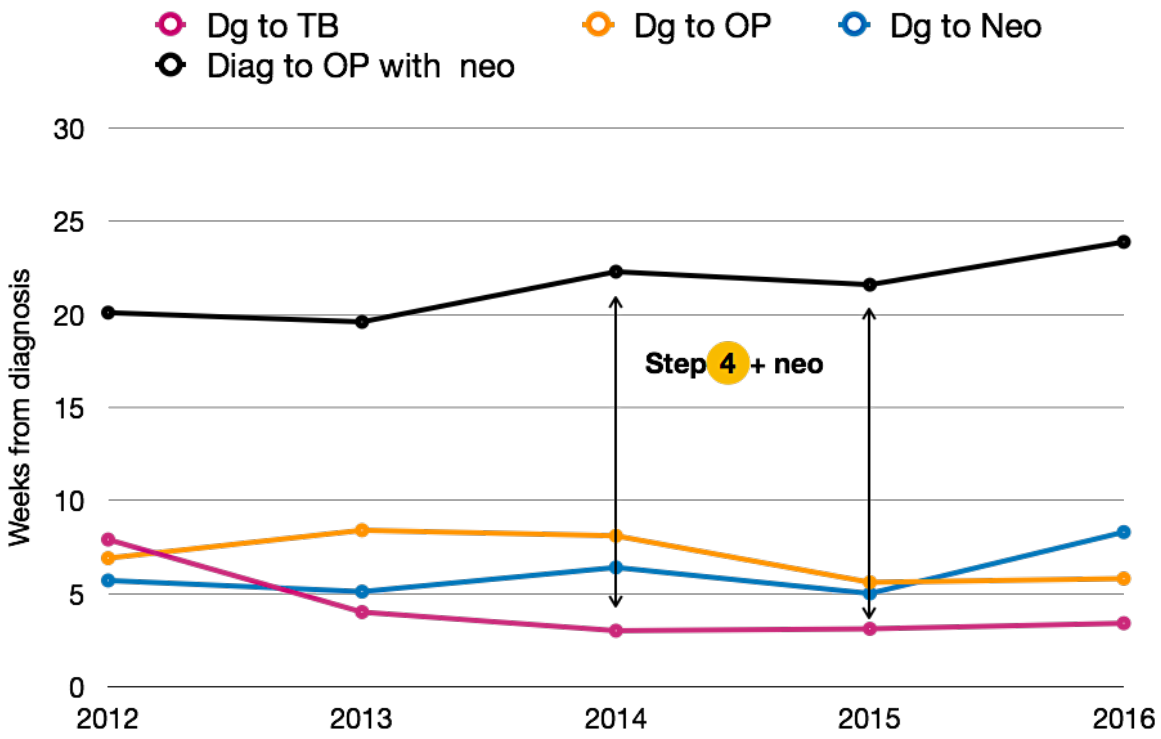
Figure 6. The median time of the steps defined in figure one, year after year.



Therefore, in order to have a better overview of the results from table 12, the results are represented in a figure 6. It shows us the different stages through the years since 2012 with the median times to represent the different curves so it would not be distorted by outliers. What we can tell is that we have some improvements for the second stage, third stage concerning the operation, and 6th stage. Indeed, we are faster for these stages compared to 2012.

As the clinical pathway was described in details in the results above, there are some important checkpoints that will give us a better global view and of the clinical pathway of the patients. These checkpoints are the diagnosis date, the first tumour board presentation and the first potentially curative action. Therefore, in order to have an idea of how fast we initiate the treatment, we are going now to probe how much time is taken from the diagnosis to the first tumour board presentation and how much time we take from the diagnosis to the operation or the neoadjuvant treatment (illustrated in figure 7)

Figure 7. Representation and evolutions of the checkpoints through the years (median weeks)



We add on figure 7 the time between the diagnosis and the operation when an adjuvant treatment is indicated. This confirms the findings we have previously made about the fourth step. It is represented by the big gap between the pink curve and the black curve which include the 4th step and the duration of the neoadjuvant treatment. Indeed, severals weeks separate the tumour board from the surgery when a neoadjuvant treatment is chosen and even more when a restaging has to be done. Otherwise, it seems that the time taken from diagnosis to tumour board and to surgery is improving through the years. Nevertheless, the time to start the neoadjuvant treatment is pretty steady though.

The stage 1 has a median time between 2 and 3 weeks according to figure 7. This stage includes the T_1 time which represents the time to refer a patient from the GP. As mentioned before, the UK applies the 2 weeks rules and we can observe in table 1 that it takes often more than 2 weeks to refer the patients to a specialist. This means that we are slower to initiate the medical care than the British.

However, an interesting finding is about the 4th step. Indeed, it is the longest step of the entire clinical pathway and has increased through the years (main reason is the delay of surgery as mentioned above). Restaging is done in less than two weeks.
By comparison with the UK, the time to treatment is shorter. From the diagnosis to the neoadjuvant treatment or the operation, the wait has never been more than 8.4 weeks (back in 2013) while 23 weeks (5.3 month) in the UK in 2004 (9) even with the two weeks rule applied. Nevertheless, it is far from the 15 days reported lately in a Spanish study (8).

Another part of the clinical pathway that deserves some attention is the follow-up. We can see that not even half of the follow-ups are completed according to recomendations. Indeed, the patients are supposed to have every 6 months an endoscopic exams which can be a rectoscopy or an endoscopy during the first two years of follow-up. According to our findings, less than 50% of them, except for the 12 months colonoscopy, had their endoscopy examination correctly done. The clinical examinations and the radiologic exams are performed more reliable, but still not perfectly on time. Table 10 shows clearly that some follow up dates are more respected than others. Indeed, the proportion of complete follow-up are better for the 12, 36 and 48 months timing. It is tough to explain this result, but the most likely reason is that we probably got more data on these three dates because the documentation might had been better at this time.

One of the projects of this study was to create a smartphone application destined to increase the compliance of patients with the follow-up. It is supposed to work as a reminder for the patient of appointments and examination dates. A first version is being currently tested.

Although guidelines were made to facilitate and improve medical care of patients suffering from rectal cancer, most patients still have different clinical pathways, which can be frequently confusing to them. Many factors can affect the care of rectal cancer as it involves many different specialities.

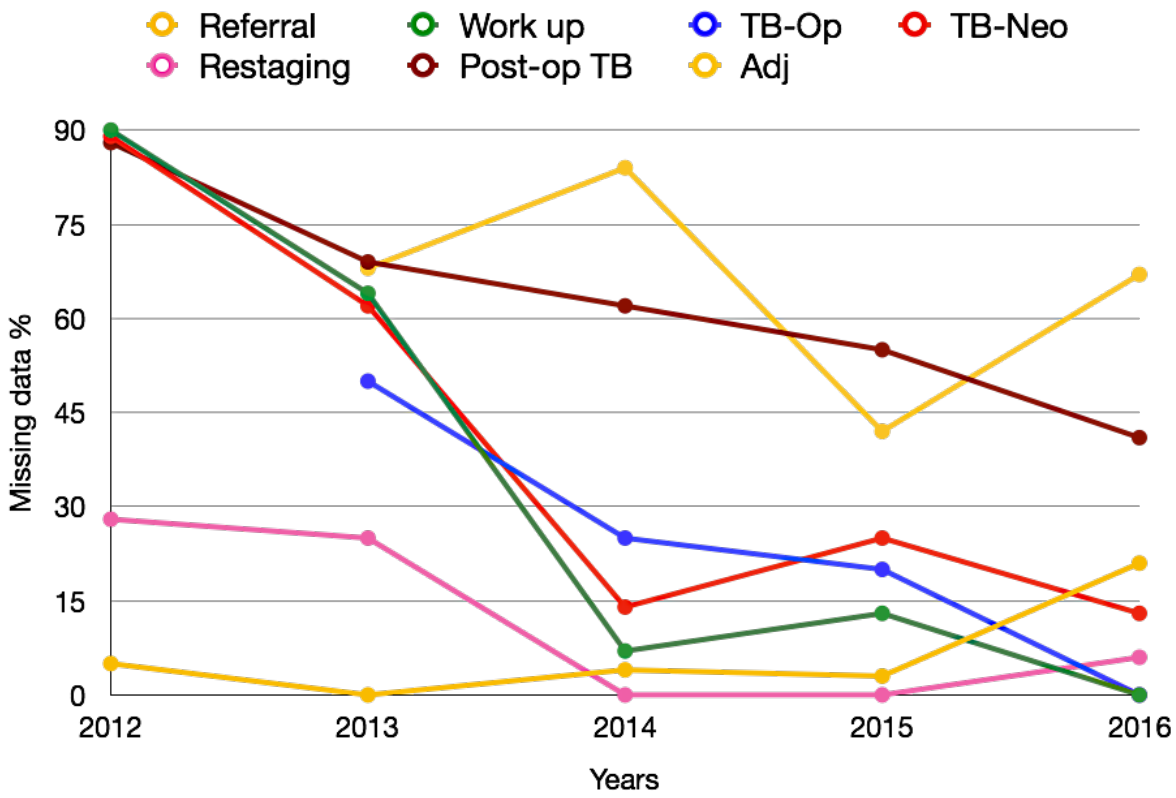
As rectal cancer is a complex tumour disease, it requires the coordination (8) between the different specialists involved in the medical care. Unfortunatly, this coordination is often lacking and might be the reason why we have a lot of variations in the patient's clinical pathways. In addition, a standardized (6) pathway could help the patient has and had a psychological impact on their state of mind with an increase of their satisfaction and a decrease of their anxiety level. In addition, a case manager independent of any clinic or department would be useful.

But do pathways work?

If we take a global look, not only on oncologic cases, we can affirm that the attempts of pathway implementation (7) seem to provide good results in the management of different diseases. It has brought a lot of benefits for the patient, costs by decreasing the length of stay, and improved documentation (8). With the implementation (8) of a multidisciplinary clinical pathway for rectal cancer patients it has been shown that the medical care can be improved in terms of efficiency with a reduction of time intervals between first diagnosis and time to treatment. Indeed, in a study conducted in Spain (8), the implementation of a clinical pathway aimed to provide treatment within 15 days after the diagnosis was given. Only 27% of the patient had their first therapeutic action within 15 days against 100% after the implementation. The time interval between preoperative treatment and surgery showed a great improvement as well. It aimed to be between 4 and 6 weeks, which only 43% had it before the implementation, against 100% after.

This study has some limitations. First, the lack of data concerning certain time intervals. The more back in time we had to go, the harder it was to find the data even for important dates. However, over time the percentage of missing data decreased for nearly all steps (figure 8).

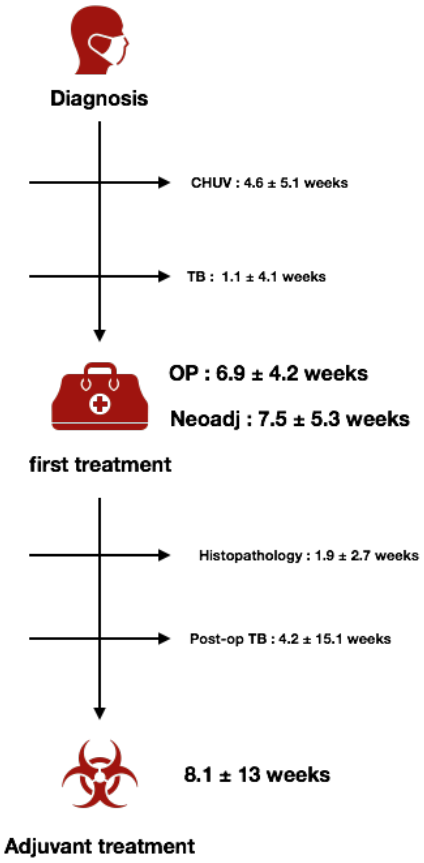
Figure 8. (%) missing data.



Secondly, this study didn't correlate the results with survival. Thus, we don't know if there was any impact on survival when the results for each stage were getting better through the years. However, in contrast to the literature, we analysed the entire pathway from diagnosis to follow-up and could identify many points of improvement. Hopefully, once the improvements are implemented, survival will increase.

Nevertheless, we can observe a lack of literature about this topic concerning Switzerland. All of the previous studies mentioned are from worldwide and most of time are not concerning rectal cancer only. Therefore, it is one of the strength of the study as it deals with a new topic, never assessed in detail before in Switzerland.

Conclusions



Now that we have described the entire clinical pathway, showed its breaches and compared it with the literature, how can we provide answers to the patients concern? Indeed, many patients ask once they are diagnosed with cancer when does treatment start?

We can answer to our patients that it takes between 6 and 7 weeks to start treatment and that it is much better than currently in the UK. This time is required to stage the disease, to meet the specialists and the time to decide what the best therapeutic option is. One of the most important points of improvement is the referral from the GPs to the specialist, which can take up to five weeks in some cases. The main time intervals that should answers most patient's questions are shown in figure 9.

After the operation, we can tell the patient it is going to take around 8 weeks to start an adjuvant treatment if indicated. This time will depend on how the patient recovers from surgery, how fast post operative histopathology is given and how long it takes to choose a strategy for the rest of the treatment.

Figure 9. The main time intervals.

The follow-ups are hard to organise and maintain according to recommendation. Here many improvements must be made.

The implementation of a standardized clinical could be a solution to improve the documentation and to minimise the delays. Concerning the follow-ups, the development of a smartphone application could be an interesting alternative in terms of increasing the patient's compliance.

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